IN THE

Supreme Court of the United States

OCTOBER TERM, 1943

No. 392

UNIVERSAL OIL PRODUCTS COMPANY,
Petitioner,

vs.

GLOBE OIL & REFINING COMPANY,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SEVENTH CIRCUIT

REPLY BRIEF FOR PETITIONER, UNIVERSAL OIL PRODUCTS COMPANY

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March 1, 1944.

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REPLY BRIEF FOR PETITIONER, UNIVERSAL OIL PRODUCTS COMPANY

Three groups of issues are presented by respondent's brief:

(1) Unclean hands.

(2) Validity.

(3) Infringement.

On the first two issues, the Findings of Fact, Conclusions of Law and Opinions of the District Court were detailed and sweeping in favor of the petitioner. They were not disturbed by the Circuit Court of Appeals. On the third, the Findings of Fact, Conclusions of Law and Opinions of the District Court were in favor of the respondent. They were sustained by the Circuit Court of Appeals.

In our main brief we reviewed, in brief outline, what we took to be the essential facts on the unclean hands and validity issues, with particular reference to the Findings of Fact and Conclusions of Law of the District Court. In our argument, we dealt with the issue of infringement, which having been the sole ground of the decision adverse to the petitioner, was the appropriate ground for presentation by the petitioner here.

The respondent has legitimately exercised its right to anticipate a decision favorable to the petitioner upon the infringement issue (the "substantial vaporization" issue) and has, therefore, sought to sustain the judgment below by a showing that the decisions of the District Court on unclean hands and validity were erroneous. Respondent has divided its presentation into five groups, respectively dealing with (I) alleged unclean hands, (II) infringement —the "vaporization" issue, (III) validity—alleged prior disclosure by Behimer of The Texas Company, (IV) validity—alleged prior art, and (V) The Egloff patent.

We will consider each in order.

I

THE CLEAN HANDS ISSUE

Respondent revives the alleged unclean hands issue, on two grounds, the first arising out of *Root Refining Company* v. *Universal Oil Products Company*, now pending in the Third Circuit (R. Br. 2, and 90), and the second arising out of Universal's efforts during the interference between the Dubbs and Behimer applications (1923-1930) to obtain evidence from employees and former employees

of The Texas Company, assignee of Behimer (R. Br. 3, 9-18, and 91).

At the outset of respondent's "Statement of the Case" under the heading of "The Parties", respondent further seeks to classify Universal as part of an alleged great patent pool of leading oil refining companies, including (inconsistently enough) The Texas Company itself (R. Br. 6-9).

A. Petitioner has not acted as part of a group or pool, but as a characteristically independent operator which in fact has provided the principal competition with the largest group of associated patent-owning companies.

It is true that Universal has always been a patent holding and licensing company. Its exclusive interest has been in research and development, and it has been only through Universal that the small independent refiners have been provided with modern and efficient apparatus for cracking and with immunity from patent litigation. From the outset, Universal license agreements have been free of all restrictions, and, on the contrary, have committed Universal to protection of its licensees in the defense of any suit that might be brought against them by any party whatsoever, including any of the great oil companies. The exclusive consideration to Universal has been a straight cash royalty; and this has twice been reduced,—once from 15¢ to 10¢, and the second time, coincident with the expiration of the Dubbs patent in suit and obviously as a consequence thereof, from 10¢ to 5¢ (Pet. main br., pp. 37-38).

Universal's most distinctive position in the industry has been as the small independent, privately financed (I, 378),

which provided real and genuine competition to the great oil refining companies, and was even prepared to fight them in extensive and costly patent litigation (Pet. br., 39-40).

It was under these circumstances that Carbon P. Dubbs made the revolutionary invention in suit.

From the first, Dubbs was engaged in a battle with The Texas Company. Affiliated with The Texas Company were the Standard Oil Companies of New Jersey and Indiana, and the Gasoline Products Company, through the patent interchange agreements approved by this Court in *Standard Oil Company* v. *United States,* 283 U. S. 163. But Universal was no party to those agreements, and indeed during the period under consideration was engaged in patent litigation with all of the primary parties to them.

During this period (the 1920s) the Royal Dutch-Shell Group and the Standard Oil Company of California had no interest in granting licenses, and each of them held licenses both from Universal, on the one hand, and from one or more members of the group of great refining companies, on the other hand. The consequence was that Shell and Standard of California were vulnerable to suit from both sides. In that position, Shell and Standard of California had a primary interest in bringing to an end the patent battle. They accomplished this by purchasing all the stock of Universal, and in connection therewith making settlements with the anti-trust defendants (Pet. br. 37).

The record before this Court tells little of the story after the settlement in 1931, which resulted in Shell and California taking over the stock of Universal and settling the patent litigation with the former primary defendants in the anti-trust litigation. Respondent in its brief, has, however, referred to the subsequent events, stating (1) that

Gulf Refining Company joined in the acquisition of Universal stock (R. Br. 6); (2) that at the time of suit Universal had licensing rights under The Texas Company and other patents (R. Br. 6); and (3) that there was collusion between Universal, on the one hand, and The Texas Company and others of the former primary defendants in the anti-trust suit, on the other hand, in the bringing of patent suits against the users of Winkler-Koch cracking stills (R. Br. 8, 9). Respondent is misled on all these points, and it becomes necessary, therefore, for us briefly to state the facts.

First. It is not Gulf, but Atlantic Refining Company, that now owns the one-sixth of the voting stock of Universal (one-half being owned by the Shell Group and one-third by Standard of California). There is no criticism whatsoever on our part of the respondent for having said that Gulf owns the one-sixth, as that was in fact the testimony of Mr. Hanna and so appears in the record (II, 560). We are correcting this on our own responsibility, and with apologies to the respondent. As a matter of fact, the error on the part of Mr. Hanna, Vice-President of the Standard of California, is symptomatic of what has in truth been the fact, viz. that Standard of California itself, like the Shell Group and Atlantic, has never in practice exercised any dominating control of Universal, which has remained under the same management and the same president (Hiram J. Halle) during all the years from before the Dubbs invention down to the present moment. The mistake of using the name of Gulf Refining Company in place of the name Atlantic Refining Company is of course without particular significance in this litigation, as neither

was actively engaged in any patent licensing in competition with Universal; but the correction is made in order that there may be no risk of a misstatement of fact appearing in the opinion of this Court. The vital point is that neither Shell, nor Standard of California, nor Atlantic (nor Gulf, for that matter), was engaged in the patent licensing business. Hence the acquisition of the Universal stock.

Second. The respondent correctly states the essence of the agreement (made in 1937) between Universal and the former primary defendants in the anti-trust litigation, viz. that Universal

> "at the time of the trial * * * had granted immunity under its patent to each of them and to their licensees, receiving in return immunity for itself and its licensees under patents held by these other companies" (R. Br. 6).

It will be apparent that this was purely a liberalizing and non-restrictive patent interchange agreement, for the benefit of the licensees of rival licensing concerns.

Third. The respondent has, however, fallen into serious error in stating or implying that there has been collusion between Universal and The Texas Company (and the other former primary defendants in the anti-trust litigation) in the bringing of suits against users of the Winkler-Koch stills (R. Br. 8-9). There has, in fact, been bitter competition between the two. This is apparent upon the face of the opinions in the cases referred to in respondent's brief. See, for example, the decision of the District Court in *The Texas Company* v. *Anderson-Prichard Refining Company*, 32 F. Supp. 348.

Texas v. *Anderson-Prichard* was a suit on the Behimer patent against a member of the Winkler-Koch Patent Club, and counsel for the respondent in this case, appearing for the defendant in that case, successfully set up the Dubbs patent, in suit in this case, against the Behimer patent. In Judge Kennedy's opinion, the following succinctly states the conflict, 32 F. Supp. 348, 353:

> "* * * The matter in dispute between the litigants is as to whether or not in the Patent Office proceeding the process in the return of the condensate was considered in its broad sense or in a limited sense (technical terms avoided) in connection with other provisions of the Dubbs patent. Defendant contends that it was considered in the broad sense and that Behimer secured it only in connection with the method of returning the condensate by a pump or mechanically applied pressure, while Dubbs retained his cyclic system* with a method of returning through gravity or any method distinguished from a machine through which pressure was applied. Plaintiff contends that the distinguishing feature was in another part of the Dubbs process involving cracking with no substantial vaporization in the coil. I think that the proceedings in the Patent Office when taken by and large indicate that the matter in dispute *was the consideration of the cyclic system in its broad sense* and that Behimer disclaimed to Dubbs any claim which he might have made upon the ground of being the discoverer of the cyclic system and accepted in lieu thereof the element of its use through a pump or mechanically applied pressure."**

*The court so designated "clean circulation", 32 F. Supp. 348, 352.

**Emphasis ours unless otherwise stated.

Here was no collusion between Universal and The Texas Company,—quite the reverse. Indeed, in Universal's suit independently brought against Globe, Mr. Richard J. Dearborn, patent attorney for The Texas Company and President of The Texas Development Company, came forward as a witness for the defendant and adhered to the position, which he had unsuccessfully asserted in the *Anderson-Prichard* case, that the basic invention was Behimer's and not Dubbs's. However, the respondent in this case, in calling Dearborn and otherwise, took precisely the opposite position to that which it took in the *Anderson-Prichard* case, and in this case put forward Behimer as a defense against Dubbs.

Neither the rights nor the disabilities of The Texas Company's Behimer patent are involved in this litigation. The Texas Company is not a party. It is not interested in either party. It is adverse to both parties. But the respondent's counsel has subtly introduced it here by insinuating that it is in alliance with petitioner, although its officers testified for respondent in favor of Behimer and adversely to Dubbs.

Viewing the present case narrowly on its merits as a patent litigation, it is entirely legitimate for the respondent to bring forward Behimer as a prior art defense, and to revive the issue as to the clean hands of Universal in its conduct of the interference proceedings in *Dubbs* v. *Behimer*. Both these defenses were overruled by District Judge Holly, after a full trial and with strong findings. They are of course revived here in support of a decree which we have submitted should otherwise be reversed upon the infringement issue.

But the revival by the respondent of the clean hands issue forces upon the attention of this Court not merely the merits of the Behimer patent, but the circumstances of its ownership. And of this the respondent has taken advantage by a citation of the action by The Texas Company based upon Behimer against another Winkler-Koch user (Anderson-Prichard), and by its innuendo that Universal was in collusion with The Texas Company in that litigation. Further, respondent has referred to *Standard Oil Company* v. *Globe Oil & Refining Company*, 82 F. 2d 488, and to *Gasoline Products Company* v. *Champlin Refining Company*, 86 F. 2d 552, again with the innuendo that Universal was likewise in collusion with the plaintiffs in those cases (R. Br. 9).

There is, therefore, forced upon the attention of this Court an understanding of the interrelation between all these cases and between the parties to them. It will be obvious that a group of hard-fought cases covering in effect the period of the last thirteen years (precisely the period during which the automobile has had its greatest expansion and the airplane has come to maturity), and involving the basic process of petroleum refining by which anti-knock and high octane gasoline have been primarily produced during that period, must have been most thoroughly presented and hard-fought, and have given rise to questions of complexity as well as magnitude.

With appreciation of the dignity of this Court as a final court of review, we must present a full picture of these cases. However, with equal appreciation of the fact that in the end the true issue in this litigation may, and in our submission should, be narrowed to the question of the

meaning of the phrase "without substantial vaporization"; we will make that review as brief as possible. Moreover, conscious of the peculiar responsibility devolving upon the authors of a reply brief when presented with a new issue in the respondent's brief, we will attempt to be dispassionate and to state as to these cases only the facts that are apparent upon the face of the reports. The vital facts are these:

1. In all of these cases the defendants have been members of the Winkler-Koch Patent Group.

2. In all of these cases the defendants have won, except only that Universal won upon the Dubbs patent and the Egloff patent before the District Court of Delaware in *Universal* v. *Winkler-Koch Engineering Company*, 6 F. Supp. 763.*

3. The Winkler-Koch defendants all acted through the same counsel who are counsel for the Respondent here. That counsel successfully asserted Dubbs as a defense against Behimer in the *Anderson-Prichard* case.

4. There is no scintilla of evidence of collusion between Universal and the plaintiffs in the other cases (all former primary defendants in the anti-trust litigation). There was in fact no collusion.

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*We expressly omit any reference to the further decision in favor of Universal in the Third Circuit Court of Appeals in *Root Refining Company* v. *Universal*, 78 F. 2d 991.

5. The Dubbs patent in suit expired in 1938. The Behimer patent runs until 1949. Universal has no interest whatsoever in any recovery under the Behimer patent, although it has obtained freedom for its licenses from suit under the Behimer patent.

6. Viewed broadly, these cases must obviously have cost millions of dollars in the aggregate to the various parties involved. They have represented what Judge Kennedy called "A battle of the titans" involving what has become the largest industry in the country, and the industry most important not merely in peace but in modern war. They have involved the question as to who made the great and revolutionary invention which, by rendering petroleum cracking efficient and economical, ushered in the new era of petroleum refining with its large yields and fine quality of anti-knock and high octane product.

But all the parties were not "titans". Perhaps the term is justly applicable to such great vertical companies as The Texas Company and the Standard Oil Companies of New Jersey and Indiana; but their rival, the petitioner here, was from the first a small, privately financed enterprise engaged exclusively in research and development, without any interest whatsoever in production, refining or marketing, and whose principal revenue has been derived from wide licensing of a multiplicity of small independent refiners.

If ever there is to be a case in which a small operator can make a practicable invention in a great field, and if ever such an invention is to be recognized by the Courts in one of our great industries, this (we respectfully submit) must be the case. Here we have the situation, almost unique in

modern times, of the lone individual rising to do battle on equal terms with the great.

Necessarily, Universal's course has been a stormy one; and it has literally never been out of the courts. For the first twenty years after Dubbs's work, continuous litigation was necessary against the greatest companies in the industry. Eventually, the merits of the Dubbs patent compelled recognition even by these great companies, and the reward for Universal was to wring from them immunity for all of its licensees, present and future, under their patents in the same field. Within a year after that final consummation in 1937, the Dubbs patent expired.

Meanwhile, Universal had been compelled to engage in a second series of battles, this time against that minority of the small independent refiners which had banded together in the Winkler-Koch Group and set up a defense fund sufficient to retain and maintain the learned and able counsel who now appear for the respondent here.

But the terrain upon which both battles have been fought has been essentially the same. In each, Universal has in effect been forced to oppose the great interests with The Texas Company in the forefront. In the first series of battles, they were the actual enemy. In the second; the Winkler-Koch Group was the ostensible enemy, but, as this Group never made any pretense of developing patentable inventions of their own, their primary defense has come to rest upon an assertion of the alleged achievements of The Texas Company (specifically, of Benimer).

In fighting these uphill battles, Universal has, of course, been constantly open to innuendoes and charges of every character. Two groups of charges have been presented by the respondent in its brief, and must be considered.

B. The pendency of the litigation in the Third Circuit Court of Appeals should not move this Court in its discretion to withhold decision in the present case.

In our original petition for a writ of certiorari, petitioner, as well as respondent, advised this Court before the grant of the writ that there was pending in the Third Circuit Court of Appeals an application to reopen the case of *Root Refining Company* vs. *Universal Oil Products Company* on the ground that there had been fraud upon the Court, and further that a Special Master appointed by the Third Circuit Court of Appeals had brought in a report to that effect.

We presume, therefore, that when this Court granted its prerogative writ, after having received that submission of facts by both parties, this Court's action was not improvident.

The problem is not jurisdictional. This Court has power to review decisions of Circuit Courts of Appeal, even though there has been no conflict of circuits. And this power has been significantly exercised in patent cases.

We entirely agree that it is within the Court's power, having granted a writ of certiorari upon the ground of conflict of circuits, to withdraw the grant if it appears that there was not in fact a conflict. But such action would be pursuant to an exercise of discretion of this Court in passing upon its own providence or improvidence. It would not be jurisdictional. And we respectfully submit that it would be a sad injustice to the petitioner, in the light of the fact that the petitioner itself frankly and promptly informed this Court of the Master's report, for this Court to set at

naught the proceedings which it thereafter authorized to be taken here by its grant of the writ of certiorari.

In the other recent patent cases in which this Court has granted a writ without a conflict of circuits, the petitioner has been not the patent owner, but the alleged infringer. However, we are confident that the fact that the petitioner in this case was granted a writ on the petition of the patent owner can be taken only as an example of the great principle that justice is blind, and as a refutation of the whisper that the scales as between a patentee and an infringer now are weighted in advance against the former.

Furthermore, we assume that in granting the petition for writ of certiorari, this Court had in mind the showing therein made by affidavit of Hiram J. Halle, President of the petitioner, that there are pending and untried eight suits based upon one or both of the patents in this suit, to-wit, three suits in the Third Circuit and five suits in the Tenth Circuit. If the Third Circuit Court of Appeals sets aside its decision in the *Root* case, there would be nine such cases. And no matter how the Third Circuit Court of Appeals should ultimately decide the issue, there would still remain the five cases in the Tenth Circuit.

In the preceding paragraphs, we have assumed for the purpose of the discussion that the Third Circuit Court of Appeals would set aside the decree in the *Root* case. We respectfully caution this Court, however, against the assumption that this means that we accept the position that there was in that litigation any fraud or wrong-doing upon the part of the petitioner.

The petitioner has itself taken the position before the Third Circuit Court of Appeals, from the first moment

that the issue arose, that it wished the case to be reopened. The very suggestion of fraud was so repulsive to the petitioner that it did not wish to stand for a moment upon a decision as to which even the suggestion had been made.

We entirely appreciate that the issues in the *Root* case are not before this Court, and we feel that it would have been appropriate had no reference whatsoever been made to them here. However, the respondent has permitted itself at the very outset of its Brief (R. Br. 2-3) to submit that petitioner is under an "imputation of corruption and unclean hands"; that the Master has found the petitioner guilty of "such fraud as tainted and invalidated the judgments"; and that if the Master's report be affirmed, petitioner's "right to invoke equitable relief with respect to these patents in this, or in any other Court, would be forever forfeited", for petitioner would "stand convicted of the most heinous offense of which a litigant could well be guilty". Having spilt this bottle of ink upon the first page of its brief, the respondent compels the petitioner to submit a statement of the true status in the Third Circuit. And petitioner will do this in the briefest possible space.

At the very first hearing before the Circuit Court of Appeals (June 5, 1941), petitioner's chief counsel in that case, Hon. Thomas G. Haight, said to that Court:

> "We are willing and we offer to let Your Honors take the record in this case, the briefs with oral argument or not, as you see fit, and determine whether this case was properly decided or whether it was not properly decided. We raise no technical objection and will raise none.
>
> "If it was properly decided, then we ought to have the benefit of it. If it was improperly decided,

> then the other side ought to have it. I make that offer with a full realization, which I think Your Honors will appreciate, that the attitude of this Court as presently constituted is far less liberal in its treatment of patents than the attitude of your predecessors, but I make it notwithstanding that because we believe that this was—it has expired nearly three years ago, the patent—the patent we believe covered a great invention and one that should receive protection." (Transcript of Hearing, June 5, 1941, Vol. I, p. 19 of Record Before U. S. C. C. A. 3d in *Root Refining* v. *Universal Oil Products Company*.)

After the Master had rendered his report, the Objections and Exceptions filed by the petitioner opened with the following paragraph:

> "And now, to wit, November 20, 1943, while from the commencement of this proceeding on June 5, 1941, as indicated by its counsel on that date, Universal Oil Products Company has at all times been willing that the above-entitled causes be reargued before this Court and now renews its offer so to do, it hereby objects and excepts to the report filed with the Clerk of this Court on October 19, 1943, by Thomas Raeburn White, Esq., appointed Master by order of this Court dated November 26, 1941, inasmuch as he erred: [Here follow the exceptions.]" (Record Before U. S. C. C. A. 3d, Vol. VIII, p. 3615.)

The petitioner has not sought to hold the benefits of the questioned decision. Compare *Hazel-Atlas Glass Company* v. *Hartford Empire Company*, U. S. Sup. Ct. Oct. T. 1943, No. 398.

The principal issues in the Third Circuit are two:

(1) While the *Root* case was pending for decision in the Third Circuit Court of Appeals, did Morgan J. Kaufman, one of the Universal attorneys, influence Circuit Judge Davis by making to a cousin of Judge Davis a secured loan of $10,000?

(2) Was the petitioner privy to this action of Kaufman?

The petitioner has strenuously maintained, and will continue to maintain, *whatever the decision of the Third Circuit Court of Appeals,* that it was entirely innocent and knew nothing of any transaction or of any improper relationship between Judge Davis and Kaufman.

All parties agree that there has not been one scintilla of direct evidence connecting the petitioner with the loan made by Kaufman to the cousin of Judge Davis. The circumstantial evidence relied upon is that the petitioner paid fees to Kaufman greater than his legal services, actually performed, warranted. In justification of the payments to Kaufman, petitioner gave reasons including particularly the fact that it was at that time standing suits for an aggregate of two million dollars by two other discontented attorneys, and that it was therefore peculiarly sensitive to the threat of such litigation by Kaufman.

The counsel for the Winkler-Koch Group, being counsel for the respondent here, have conducted the entire proceedings against Universal in the Third Circuit, as volunteer *amici curiae* of the Third Circuit Court of Appeals (although concededly compensated by the Winkler-Koch Group), upon the basis that, although they could not prove

any connection on the petitioner's part notwithstanding that the petitioner's officers and attorneys came forward freely as witnesses, the proposition that "fraud walks in darkness" should suffice.

The respondent is not warranted in making the statement at the top of page 3 of its brief to this court "that the fraud consisted in the fact that Universal Oil Products Company through its attorney, one Morgan S. Kaufman, extended monetary favors to J. Warren Davis." Its request for a conclusion by the Master to that effect,—that the petitioner "through its agent Morgan S. Kaufman, by means of a bribe corruptly influenced Judge J. Warren Davis"—, was expressly denied by the Master (Record Before U. S. C. C. A. 3rd, Vol. VIII, pp. 3571-3572).

The facts found by the Master were that Kaufman made a loan to the cousin of Judge Davis and that the latter had an interest in it; but the Master did not find that the petitioner knew of this. It is true that in the Master's own opinion, based in the last analysis purely upon the presumption against petitioner raised by the amount of Kaufman's fees, he concluded that Universal, even though it did not know what Kaufman would do with the money paid him, did know that in some way the money or prospect of receiving it would be used to influence Judge Davis. This, of course, the petitioner strenuously denies.

And the vital distinction remains between the relations between Kaufman and the Judge, on the one hand, and the issue as to knowledge by the petitioner, on the other hand.

There are of course in addition the serious procedural questions as to whether this Court has power, notwithstanding R. S. § 698, Judicial Code, 28 U. S. C. A. § 863, to con-

sider the facts before the Third Circuit Court of Appeals, as they are not in the record in this case; or whether, if the Third Circuit Court of Appeals does affirm the Master's report, any effect can be given to such determination as evidence in this case in view of the lack of privity on the part of the respondent to the proceedings in that case, *Rumford Chemical Works* v. *Hygienic Chemical Co.*, 215 U. S. 156, 160. In any event, if such determination could possibly have any bearing as newly discovered evidence upon the issue of unclean hands in this case, there should be considered the availability to the respondent of the procedurally appropriate remedy of Bill of Review, Federal Rules of Civil Procedure, § 60-b, which, if the respondent were aggrieved, it might be able to present in the District Court after the coming down of the mandate from this Court in favor of the petitioner, *United States* v. *Knight's Administrator*, 66 U. S. 488. We are not presenting these procedural points at any length in this brief, as we feel justified in asserting with confidence the irrelevance of the entire Third Circuit Court of Appeals question and the innocence of the petitioner.

It is therefore respectively submitted that this Court is free to determine the present case *on the merits*.

C. Petitioners' methods of obtaining information for defense against The Texas Company in the Dubbs-Behimer interference (1923) were clean and legitimate, and, in any event, do not provide a defense to the respondent.

There are two answers to respondent's claim to an unclean hands defense based upon the Behimer interference proceedings,—one on the facts, the other on the law. We will consider them in order.

District Judge Holly, after a full trial in open court at which he heard and saw the witnesses, made Findings of Fact and Conclusions of Law (I, 463-468) exonerating the petitioner of the charges. He also delivered an oral opinion at the close of the testimony (I, 460-463).

The conclusions of the District Court are, of course, entitled to the ordinary presumptions of soundness.

(i) The Facts

The Dubbs patent had issued in 1921. In 1923 an interference was instituted in the Patent Office between the Dubbs patent and an application of Holmes (President of The Texas Company), Manley (another high officer of The Texas Company) and Behimer, which was owned by The Texas Company and contained claims copied from the Dubbs patent by The Texas Company (FF 5; I, 464). Holmes and Manley later withdrew their names.

Neither the respondent nor any other member of the Winkler-Koch Group had anything to do with this interference proceeding at any stage. Indeed, the Winkler-Koch Group had not been formed at that time.

Dubbs described on the witness stand how in 1923, when as a result of the declaration of the interference he gained access to the Behimer file wrapper and learned that Behimer claimed successful reduction to practice in May 1917 (FF 6; I, 464), he (Dubbs) was dumbfounded, because he knew that at this time The Texas Company had installed at a cost in excess of $3,000,000 a commercial cracking plant consisting of a battery of 24 stills that did not practice clean circulation (I, 394; and *infra*).

Dubbs further explained that in protracted litigation which the petitioner had formerly had both with The Texas

Company and Standard Oil of Indiana, he had formed the belief that The Texas Company had participated in putting the Adams patent through the Patent Office by improper means (1, 394; FF 6; I, 464).

We need not try here the issue whether Dubbs was right or wrong in suspecting the *bona fides* of The Texas Company. The material fact is that he did suspect it, and that he had at least substantial grounds for so doing (see further discussion *infra* under Point III, as to the admissions by Behimer and other Texas Company officials that, at the time of filing of the application, they knew that there had not been a successful reduction to practice).

It thus became vital to the petitioner and to Dubbs to find out what in fact The Texas Company had been doing. This they sought to do by two means: employing Behimer himself at an increase in salary, and employing an agent (one Wannack) to interview other employees and ex-employees of The Texas Company. Both means were entirely legitimate; and indeed some such means is always necessary when it is vital to one party to find out the true facts as to the position of the other and when the first party does not believe that the facts have been truly represented by the other. The investigation was commenced "in good faith for the sole object of ascertaining the facts and truth regarding the Behimer work" (FF 7; I, 464; I, 395). "All that was sought by Universal in prosecuting the investigation, was the ascertainment of the truth and facts concerning the work that had been done by Behimer and The Texas Company. There is no evidence to the contrary" (FF 8; I, 464).

In dealing with Behimer, the petitioner was scrupulous to agree that his knowledge, experience and testimony

should always be available to The Texas Company in respect to anything that he had ever done while in its employ, including in respect of the application at issue in the interference (FF 9; I, 465). His employment contract provided that "It is understood between the parties hereto that the party of the first part [Behimer] retains the right to execute all proper papers and testify relative to his former patents and patent applications now owned by his former employers or their assigns" (I, 274).

Behimer in the summer of 1927 was under no contract requiring him to remain in the employ of The Texas Company (I, 272-4). His salary with that company was ~~$15,000~~ $333 per year (I, ~~275~~). The simple story behind his hiring is that he accepted a better offer from the petitioner (I, 296). Accordingly, the District Court found

> "Behimer was within his legal rights in leaving the employ of The Texas Company and accepting employment with Universal, and Universal was within its rights in employing him, and there was nothing reprehensible about Behimer resigning from The Texas Company and accepting employment by Universal, or about his employment by Universal" (FF 12; I, 465).

Most of respondent's citations to the record are either to the testimony of Wannack or to the testimony of employees of The Texas Company relating to conversations which they had with Wannack. It was conclusively established at the trial that Wannack was at the time of the trial suffering from paresis, of which one of the usual symptoms is a delusion of grandeur and power (I, 451-2, 458). Even twenty years before, Dubbs's choice of Wannack as an investigator may have been unfortunate, but the

fact is that neither Dubbs nor Universal gave authority to Wannack or anyone else to engage in any improper practices or to make any effort to break into the offices of The Texas Company (I, 397). Indeed, upon discovery that Wannack had taken it upon himself to engage in any but proper methods of investigation, he was immediately removed by Dubbs from his position as investigator, and was given notice of discharge by the company (I, 400-1). Even Wannack testified at the trial that his only authorization from Universal was to ascertain the true facts regarding the work of Behimer and that he was not requested to keep or destroy any of the records of The Texas Company (I, 261-2).

It had become the duty of the judge to choose between the witnesses; and he elected to accept as truthful the testimony of Dubbs rather than that of Wannack. Dubbs testified (I, 396):

> "Wannack was never directed or authorized to get access to the files of The Texas Company; that was never even discussed. I did not make any such statement as Wannack has testified to—that I told him to secure run sheets or blue prints, and that the sky was the limit in securing such evidence. I only told him to get such information from people he might contact that they would have in their personal possession."

The District Court made these findings of fact, among others:

> "9. Universal never had any intention, and no attempt was ever made, to purloin or keep or destroy any records of The Texas Company, or to suppress, impair or destroy evidence . . . and none of these

results followed from any of the acts done or attempted to be done by Universal. . . .

* * *

"11. The aforesaid investigation in no manner injured or prejudiced The Texas Company or the defendant in this cause, or anyone else.

* * *

"23. Neither Otto Wannack or anyone else representing the Universal Oil Products Company and making investigations on its behalf, was asked by Universal Oil Products Company to take and keep any records of The Texas Company, and did not, in fact, get any such records." (FF 9, 11, 23; I, 465, 468.)

Contrary to what respondent states in the sentence beginning at the bottom of page 3 of its brief, the facts, as stated by it on page 3 of its brief, were neither admitted by petitioner nor found by the District Court.*

Respondent makes much of the $25,000 loan "against Behimer's first five years' bonus" (Res. Br., pp. 14-15). The implication that this bonus was paid as a bribe is belied by the uncontradicted testimony of respondent's witness, Behimer, himself. He testified (I, 295) that in the course of his negotiations with Universal's representatives, his father suggested that he would have to move his home, that he would probably have to buy a new home and have higher living expenses, and that " 'you better put in the con-

*As a single example, respondent's statement (R. Br. 15) that Mr. Hall (of counsel on this brief) stayed with Behimer in California is not true in fact and the District Court did not so find. In fact, Mr. Hall *casually* met Mr. Behimer at another hotel (I, 298).

tract an advance of some kind so that you would be able to incur any extra expense or do what you want to do after moving.' " Behimer stated that that suggestion was later incorporated in the contract in the form of the $25,000 advance against the bonus (I, 295). Respondent's own testimony thus leaves scant room for the accusation of bribery or the suppression of evidence.

Respondent also endeavors to make capital out of Behimer's vacation trip to California immediately after entering the employ of Universal (Res. Br., p. 15). Again, Behimer, himself, destroys respondent's theory. He was not spirited away but, on the contrary, he insisted on taking a vacation (I, 295), and it was upon such insistence that Dubbs suggested the vacation trip to California, which was taken. Furthermore, it was Behimer himself, who wished to undertake this trip without advising The Texas Company of his whereabouts, because he did not "want any comeback" or any "complications," nor did he want any "counter propositions." "I had decided" (I, 297).

In addition to the finding as to the hiring of Behimer which we quote above, the District Court made many others (I, 464-8) wholly exonerating Universal from any wrongdoing. The findings point out that Behimer's whereabouts could easily have been ascertained at the office or plant of Universal; that Universal had at no time attempted to influence Behimer to testify falsely, or to suppress any evidence, or to make any false affidavits of statements (FF 15, 16, 17; I, 466-7); that Behimer left his complete records with The Texas Company, and these remained with The Texas Company at all times (FF 14; I, 466); that the hiring of Behimer had no bearing upon the disclaimer filed by The Texas Company in the interference

(FF. 20; I, 467). Indeed, it is undisputed that within approximately two weeks after returning from his vacation, Behimer had a conference with the Texas patent attorney, Dearborn (I, 188-9), and that thereafter he executed all documents which were properly submitted for his signature.

Behimer testified fully in this litigation for the *respondents*, not only on the unclean hands issue, but on the merits.

The District Court's disposition of the unclean hands issue in the findings, and his opinion rendered immediately upon the close of the evidence (I, 460-3), are not only fully supported by the evidence, but we believe that no other result could have been reached.

(ii) The Law

The case is an apt one for application of the rule that the findings of the trier of the facts, particularly where they rest largely upon the testimony of witnesses heard in open court, will not be disturbed if there is any evidence in the record to sustain them. *Alabama Power Co.* v. *Ickes*, 302 U. S. 464, 477; *Borden's Co.* v. *Ten Eyck*, 297 U. S. 251, 261; *United States* v. *Jefferson Electric Co.*, 291 U. S. 386, 407; *Crowell* v. *Benson*, 285 U. S. 22, 51; *Mason* v. *United States*, 260 U. S. 545, 556; *Davis* v. *Schwartz*, 155 U. S. 631, 636; Rule 52(a) Federal Rules of Civil Procedure.

It is suggestive of the weight to be accorded to respondent's argument on unclean hands that it fails to point out a single finding which is not supported by evidence in the record.

The present case is not akin to *Keystone Co.* v. *Excavator Company*, 290 U. S. 240, and indeed the action of

petitioner here was far less serious than that of the plaintiff in *Toledo Co.* v. *Computing Co.*, 261 U. S. 399. It was there asserted in a patent infringement suit that plaintiff had suppressed evidence of prior invention by buying up, wherever possible, all scales embodying the alleged prior invention. In affirming a decree for the plaintiff, this Court said (p. 422):

> "But there is not anywhere in the record, which we can find, or which has been pointed out to us, any real evidence that the Toledo Company was, in the slightest degree, interfered with by acts of the Computing Company in its search for evidence of the Phinney prior use. * * * There is not a scintilla of evidence to show any effort on the part of the Computing Scale Company to induce any witnesses not to testify, or to spirit them away from contact with the Toledo Company. There is nothing to show that if the Computing Scale Company had not bought the Phinney scales; the Toledo Company would have found them any earlier."

Needless to say, if Wannack's diseased mind led him to push his investigation further than the bounds of propriety prescribed, Universal, although his principal, would not be guilty of unclean hands on that account. In *Associated Press* v. *International News Service*, S. D. N. Y., 240 Fed. 983, mod. 245 Fed. 244, aff'd 248 U. S. 215, the District Court said (p. 989):

> "Now the doctrine that he who comes into equity must come in with clean hands does not recognize mere imputations of guilt based upon technical theories of agency. To invoke it a knowledge must exist on the part of the principal of the facts upon which the charge of unconscionable conduct is based, and in the case of a corporation those facts must be

brought home to the persons exercising general control over its affairs."

Even if impropriety had been found in Wannack's endeavors, and if such impropriety could be charged to the petitioner here, there is authority for the proposition that substantial scope will be permitted a party engaged merely in seeking to determine the truth. In such a situation equity is reluctant to apply the doctrine of unclean hands, even though the conduct complained of, if directed toward an improper end, would have been condemned. *Vulcan Detinning Co.* v. *Assmann*, 185 App. Div. 399, 428-9. While a contrary expression may be found in *The Stevens-Davis Co.* v. *Mather & Co.*, 230 Ill. App. 45, 124 (Res. Br., p. 92), the court was there, as the opinion at the place cited indicates, directing its remarks at conduct which went far beyond the simple ascertainment of facts.

It is well settled that a plaintiff will not be barred from maintaining its suit on the ground of unclean hands unless its conduct bears directly upon the equity sought to be enforced, and affects the equitable relations between the parties with respect to the subject matter being litigated. The rule was so stated by this Court in *Keystone Co.* v. *Excavator Co.*, 290 U. S. 240, 245:

> "But courts of equity do not make the quality of suitors the test. They apply the maxim requiring clean hands only where some unconscionable act of one coming for relief has immediate and necessary relation to the equity that he seeks in respect of the matter in litigation. They do not close their doors because of plaintiff's misconduct, whatever its character, that has no relation to anything involved in the suit, but only for such violations of conscience as in some measure affect the equitable relations be-

tween the parties in respect of something brought before the court for adjudication."

This is the general rule. *Loughran* v. *Loughran*, 292 U. S. 216, 228.

In the present case, not only has the respondent suffered no wrong by reason of the awarding of priority to Dubbs in the interference proceeding, but it has actually been benefited thereby. At the time the decision was made, the Dubbs patent had only about seven years to run. Had the award of priority been made to Behimer, however, the patent would thereafter have been issued to The Texas Company for the full statutory period of seventeen years. Consequently, defendant would have been subject to a patent on the "clean circulation" process for a much longer period (FF 22, I, 468).

In fact, the group of users of the infringing Winkler-Koch process, including the respondent herein, who are conducting the defense of this suit have, in another suit brought by The Texas Company against one of the group for infringement of the patent issued to Behimer, relied upon the decision in the Behimer-Dubbs interference to defeat the claim of The Texas Company. *Texas Co.* v. *Anderson-Pritchard Refining Corporation*, W. D. Okla., 32 F. Supp. 347, 353, aff'd 10 Cir., 122 F. (2d) 829, 837. Clearly, the maxim ought not be applied in favor of a defendant who in another case has sought to utilize to its advantage the patent whose issuance is now sought to be made the basis of the unclean hands charge against the petitioner. On such facts, "to apply the maxims relied on" by respondent "would but pervert them." *Langley* v. *Devlin*, 95 Wash. 171, 163 Pac. 395, 401.

Under all of the many cases above cited, it has uniformly been held that the maxim of unclean hands will be

applied to bar a plaintiff from equitable relief only where the conduct in question in some measure affects the equitable relations between the parties in respect of the matter brought before the court for adjudication. Assuming plaintiff's conduct prior to the termination of the interference proceeding to have been as reprehensible as respondent here suggests, none the less the equitable relations between the parties here have not been affected.

Presumably the respondent contends that the conduct in question had some bearing upon the interference preceding which, as a result of disclaimer, resulted in Dubbs's favor. Assuming this to be so, there is nothing in the complaint (I. 15-22) which relies upon or even refers to the interference. Indeed, it is well established that not only the decision on the interference had no effect as *res judicata*, but even had it been against the Dubbs patent, which had already been issued, it would not in any way have invalidated that patent. *Baldwin Co.* v. *Howard Co.*, 256 U. S. 35; *Johnson* v. *Mueser*, 212 U. S. 283; *Frasch* v. *Moore*, 211 U. S. 1; *Morgan* v. *Daniels*, 153 U. S. 120.

The case then comes down to this: Petitioner sued on a validly issued patent, making no claim in the pleadings with respect to the interference subsequently instituted but resulting in its favor. The respondent for its own purposes brought into this case the interference, the disclaimer filed therein, and the Patent Office conclusion reached. Having done so, respondent now wishes the Court to hold that alleged improper conduct in connection with a determination, which respondent itself first brought into this case, should in some way debar the petitioner from relief.

This claim of respondent is made in spite of the fact that the entire matter of precedence as between Dubbs and

Behimer was fully litigated in this proceeding without regard to the interference, and in spite of the fact that respondent had available to it and called as a witness everyone in any way connected with the Behimer invention, including Behimer himself. This evidence is considered under III, *infra*. Respondent's extraordinary contention is made even though it does not claim any suppression of evidence, or that any effort was made to suppress evidence, or that respondent was hampered in any way in making proof in this case.

The decision in the *Keystone Driller* case, 290 U. S. 240, *supra*, has nothing in common with such a situation. In that case the plaintiff affirmatively pleaded and sought to obtain preliminary injunction on the basis of a decision previously obtained in *Byers Mach. Co.* v. *Keystone Driller Co.*, 6 Cir., 44 F. (2d) 283. In the second case, the defendant showed that the decision in the *Byers* case had been obtained in part by the suppression of evidence of one Clutter, whose prior use might have rendered the Downie patent invalid. The plaintiff in the second case, 290 U. S. 240, was defeated not because it had suppressed the evidence of Clutter in the first case, but because it sought in the second case to obtain injunction on the basis of the prior decree, which had been improperly obtained. And in the third case, *Keystone Co.* v. *Northwest Eng. Co.*, 294 U. S. 42, in which the Downie patent was ultimately held invalid, the decision was made on the merits in each of the three courts deciding the matter, although it is clear from a footnote (294 U. S. 44) that this Court at least, and presumably each of the lower courts, was fully acquainted with the prior litigation in which the Clutter evidence had been suppressed.

The decision in *Morton Salt Co.* v. *Suppiger Co.*, 314 U. S. 488 (Res. Br., pp. 91-2), does not change the rule here applicable. As this Court indicated in the opinion, the plaintiff in the *Morton Salt* case was not denied relief by reason of an application of the ordinary equitable maxim of unclean hands, but was denied relief on the ground of public policy. The complaint would presumably have been dismissed as surely if the action had been at law.

The basis of this decision was that the enforcement of the patent would aid in the violation of a statute. The plaintiff was seeking to enforce rights which, under the circumstances, were contrary to public policy. In that situation it has long been settled that the plaintiff's rights, whether contractual or otherwise, will not be enforced. Since the decision in the *Morton Salt* case, the lower federal courts have recognized that it does not change the rule of the *Keystone Driller* case, but relates to a peculiar situation in which recovery is denied because the plaintiff's action is condemned by statute, and thus is contrary to public policy.

But even if it be assumed that the decision in the *Morton Salt* case is an extension of the principle announced in the *Keystone Driller* case, none the less it would have no application here. In the *Morton Salt* case it was held that the petitioner in the very suit involved was seeking the aid of the court to validate a patent whereby it was then carrying on an unlawful enterprise. The suit was in aid of inequitable conduct. No such situation is here alleged.

If there had been inequitable conduct, it ceased years before the present action was instituted or tried. Neither the *Morton Salt* case nor any other decision has held that courts of equity will search the record and award relief only to suitors who "have led blameless lives," 314 U. S., p. 493.

Again, if there had been inequitable conduct, only The Texas Company would have been affected.

The public has no vested interest in the petitioner's ignorance. If there were facts material to the Dubbs-Behimer interference which the petitioner would not have known but for the exercise of some improper method of ascertaining them, The Texas Company might have ground to assert that it had been injured by the petitioners' having ascertained the truth, but the public can never be injured by ascertainment of the truth by both parties to a litigation.

Nor could the respondent be affected. It had no part in the Dubbs-Behimer interference, and the petitioner was not interested in the respondent at the time that it sought the information by The Texas Company. If the petitioner had by improper means learned more about The Texas Company and Behimer, the respondent would still have remained equally free to contest the validity of either the Dubbs patent or the Behimer patent or both.

II

THE INFRINGEMENT ISSUE

Respondent's "Fireless Cooker" Theory has no application to the Dubbs Patent.

This is the catch name by which respondent designates its perversion of the process of the Dubbs patent (R. Br. 28-35).

If what respondent meant, by calling the process of the patent a "fireless cooker" process, was that, in Dubbs, all the heat is introduced into the oil in the cracking tubes B and none in the vaporizing tubes C, we would agree that

these steps are a part of the process of the patent; the analogy would have some meaning. However, respondent does not stop there. The operation to which it applies this catch name is not the real operation, but the operation after there have been grafted onto it the many unwarranted distortions by respondent's expert.

In respondent's construction of the process of the patent, within the conditions of the illustrative example, any substantial formation of vapor is avoided in tubes B. To reach this result, respondent confines the operation of the process to the use of the lowest part of the temperature range of the illustrative example, discarding all the higher temperatures specified; alternately, respondent suggests that, if the higher temperatures of the range are to be used, the pressure specified must be discarded, and rather than using a pressure of "approximately 100 pounds", pressures of the order of 500, 850, or even 2,000 pounds must be adopted (R. Br. 47, 118).*

Moreover, respondent discards the operation taught in the Dubbs patent, wherein the vaporizing tubes C are insulated; it discards also Dubbs's clear teaching that if the C tubes are heated, they are heated only to compensate for

*Petitioner agrees that before Dubbs's advent it was well known that vapor generation could be decreased or prevented by increasing the pressure, as suggested by respondent at page 47 of its Brief. Petitioner disagrees with respondent's contention (R. Br. 47, 104, 106) with respect to the upper range of temperatures of the illustrative run, that in determining the meaning of the word "vaporization" in the patent, or in operating the process of the claims to fit respondent's construction thereof, one is allowed to first depart substantially from the operating conditions specified in such run, to such an extent that the pressure there specified of approximately 100 pounds is increased to pressures above 500 pounds.

radiation losses. Respondent makes its position eminently clear on the latter point at page 124 of its brief. There, under the heading "Process of Dubbs's Patent", under No. 2, subparagraph (b), it is stated that the cracking temperature which the oil attained in the B tubes must be maintained in the C tubes. This requires putting enough heat into the oil in the C tubes to prevent any drop of temperature that would result from heat losses due to vapor generation and cracking. Indeed, since, in respondent's fictitious operation of the Dubbs process at the lower part of the temperature range of the example, the cracking operation is substantially confined to the C tubes (R. Br. 29), the amount of heat introduced to the oil in the C tubes would be substantial—and the C tubes would be endowed with all the disadvantages and hazards of the Burton process.

Petitioner's distinction between loss of heat by radiation, and loss of heat by vapor generation or cracking, is not "absurd" (R. Br. 47) in view of the principle of Dubbs and the explicit distinction that the patent itself makes when it mentions only radiation losses (VII, 3089, lines 99 to 105). In this connection respondent has not fairly represented the testimony of Pyzel, upon which it relies in support of its contention that Dubbs permits supplying to oil in the C tubes heat lost from vaporization and cracking. Pyzel testified on several occasions that in the operation of the demonstration run of the Dubbs process which he witnessed,

> "* * * the oil was carried over to a series of four or five horizontal ten inch tubes [C tubes], which were also placed in a furnace but were not really heated, but only kept at a high temperature, that is to say, they were placed in part of the furnace in order to avoid loss of heat." (I, 507)

"* * * These ten inch tubes were either in a separate furnace or they got flue gas from the other furnace. It was built in such a way that those tubes were not overheated. They were heated to keep them warm to prevent them from losing heat by radiation. * * * It was certainly not the object to supply heat in these large tubes because they were cracking. That was done in the tubes before." (I, 517)

Wholly apart from the testimony of Pyzel, the original contemporaneous records of the mid-summer demonstration (PX 597, IV, 1823-62) establish that in the operation of the demonstration plant, which was substantially the same as the operation which Pyzel witnessed, the temperature of the oil at the outlet of the B tubes dropped materially in the C tubes.

Respondent relies upon the commercial operations of the Dubbs process, in which a large unheated (actually insulated) chamber was used (R. Br. p. 29), with a consequent drop of temperature beyond the discharge of the B tubes. These commercial operations are the antithesis of respondent's construction of the patent, in which the temperature of the oil in the C tubes must be maintained *the same* as that reached in the B tubes by supplying to the oil sufficient heat to compensate for temperature drop due to vapor generation and cracking (R. Br. 46-7, 124).

Again respondent suggests that the success of the commercial Dubbs operation was due to the application of the two-step or "fireless cooker"* principle which respondent

*At p. 127 of its brief, respondent states that in the case of *Texas Co.* v. *Anderson-Prichard Refining Corporation*, 122 F. (2d) 829, "the Court of Appeals held that Behimer's claims must be interpreted in the light of his specification, which, like Dubbs's, teaches a two-step "fireless cooker" cracking process * * *". On

finds in Dubbs (R. Br. 34), whereby no substantial cracking and vapor generation occur in the heating coil or B tubes (R. Br. 56). This is directly contradicted by the undisputed evidence that in all Dubbs commercial operations substantial vapor generation and substantial cracking occurred in the cracking coil or B tubes (II, 693-4).

The primary function of the C tubes is not vapor generation, but vapor liberation.

We have fully pointed out in our main brief that a primary function of the C tubes is to liberate the vapors from the oil in which they are contained as a foam (P. Br. 79-82), and not, as advanced by respondent (R. Br. 111, 129 and elsewhere), to generate vapors. Respondent's conclusion is based on its unwarranted reconstruction of the Dubbs specification. But even in this reconstruction, where generation of vapor is an important function of the C tubes, the liberation of the generated vapors in such tubes is at least as important, and an essential of the process, because according to respondent's expert vapor generation without liberation does not make a useful distillation process in the petroleum refining industry (III, 1163).

On this point, respondent attacks (R. Br. 129) the statement of the District Court's opinion in the *Root* case that "the primary function of the C tubes is to separate the vapor from the liquid", by reference to certain testimony

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page 60 of its brief, respondent seeks to create a similar impression.

The Court did not use the words "fireless cooker"—it did not say that Behimer's specification, *"like Dubbs's,* teaches" such a process.

of Dr. Brown (II, 750-1). Its argument is not supported by the cited testimony of Dr. Brown. In the testimony upon which respondent relies, Dr. Brown was considering a hypothetical case where separation *alone* would take place in the C tubes. Since, according to Dr. Brown, some generation of vapor also occurs in the C tubes, the hypothetical case there considered offers no support for respondent's assertion that grave error was committed by the District Court in the *Root* case. The view of Dr. Brown that liberation of the vapors is the primary function of the C tubes was correctly adopted by Judge Nields.

It was the "clean circulation" feature of the Dubbs patent that solved the carbon problem.

Respondent (Brief, pp. 35-36) erroneously contends that in the Dubbs patent "clean circulation" is not the solution of the carbon problem but is a minor step in a two-stage cracking process which is primarily responsible for the solution of that problem. As a preliminary to its discussion of this point, respondent misstates Dr. Brown's definition of "clean circulation." Dr. Brown did not testify that "clean circulation" is merely the return of reflux to the inlet of the cracking tubes B instead of directly to the vaporizing tubes C. What he actually said was that such an operation would not be clean circulation because there "would be no circulation at all through the B tubes. I wouldn't consider that 'clean circulation' " (II, 708, 709). Such a procedure obviously would not exhibit one of the essentials of "clean circulation." Dr. Brown repeatedly, directly and clearly defined "clean circulation" throughout his testimony as involving the combination of the return to

the inlet of the cracking tubes of the reflux uncontaminated with the residue, and the withdrawal and isolation of the residue from the system (II, 663, 745).

Respondent's argument begs the question. The question is whether the withdrawal of the residue from the system together with the cycling of the uncontaminated reflux to the inlet of the cracking oil, solved the carbon problem, or whether the carbon problem was solved by a procedure in which the reflux is returned directly to a cracking and vaporizing chamber. Dr. Brown referred to the many advantages of the first described operation or "clean circulation" as contrasted with the return of the reflux to a vaporizing and cracking chamber, and described how such "clean circulation" was responsible for the solution of the carbon problem (II, 657-9). Judge Holly found the "clean circulation" of Dubbs was "new and revolutionary" (VI, 3043) and that "Dubbs solved the carbon problem" (VI, 3037).

The fallacy of respondent's argument is also established by the comparison of the Holmes-Manley stills without clean circulation, with the operation of such stills when subsequently modified to include the principle of clean circulation. This is next discussed under a suitable caption.

Respondent's contention that the record shows commercial cracking stills functioned as well without as with clean circulation is erroneous.

Respondent's attempt to disparage the value of clean circulation is specious. In its brief (pp. 37-8) under a heading in bold type it argues that the record establishes that commercial cracking stills function practically as well without clean circulation as with clean circulation. It contends that the Holmes-Manley still (VI, 2721), installed

by The Texas Company in 1920, characterized by passing the oil through a preheater 3 and discharging the same into the first of four vertical chambers 5' x 30' in diameter seated in a furnace to which chambers the reflux is returned to mix with the residue, is for all intents and purposes as efficient as the Dubbs clean circulation process.

The record is directly to the contrary. In the Holmes-Manley operation, when reflux was returned to the bottom of the directly-fired vertical stills or chambers (II, 949, 978) and there intermixed with the residual oil, the on-stream period did not exceed above 60 hours with a gasoline yield of approximately 31% (IV, 2699), an operation little better than the Burton-Clark procedure. When clean circulation had been achieved and the principle embodied in the Holmes-Manley stills, these stills had the capacity to reach, and did reach, on-stream periods up to 500 hours with gasoline yields of from 35-38% (I, 491). The on-stream period was thus increased by 700%, with a substantial increase in gasoline yields. Such runs were attained by Standard Oil of Indiana with the Holmes-Manley clean circulation system. Runs of longer duration with gasoline yields of 40 to 45% are obtained with the Dubbs process embodying clean circulation (II, 559-60).

The Texas Company fully realized the worth of clean circulation and its amazing advantages. The original Holmes-Manley stills, upon which respondent bases its comparison, were operated as they were only because The Texas Company had been unable to achieve clean circulation. When this was achieved, it promptly converted each of its commercial stills to practice clean circulation and never again returned to the prior and inefficient method of returning the reflux directly to the heated drums or retorts.

The District Court, contrary to respondent's contentions, found that the Dubbs process (clean circulation) was "recognized immediately by the larger oil companies as a great improvement in the art" (VI, 3039) and was recognized as "new and revolutionary" (VI, 3043).

Meaning of the word "vaporization" in the Dubbs patent.

In our main brief (P. Br. 68-87), the Dubbs patent as a whole has been considered, and the specific reasons why the word "vaporization" as used therein must mean "liberation" have been stated. To what is there said, we add the following comments in reference to the illustrative example of the patent and the arguments in respondent's brief in respect thereto.

To support its position that vapor generation does not occur when operating at the bottom of the temperature range, respondent is forced to depart from the principle of Dubbs.

Respondent, as it must, concedes that, operating according to the illustrative example of the Dubbs patent, save for the lower part of the temperature range, "*i.e.*, about 750 F." (R. Br. 46), substantial vapor generation would occur in the cracking tubes B. This is substantially in accord with the testimony of its witness Smith (III, 1150). Consequently in an effort to maintain its position, respondent and its witness Smith find it necessary to exclude from the temperature range "of 750° to 860° F." of the illustrative run of the Dubbs patent the entire range there given, save the lowest end, or a temperature of about 750°

F.; or, in the alternative, to substitute an operating pressure different from the pressure of 100 pounds correlated with the temperature range of the illustrative example.

Respondent's witness Smith testified that, to operate the Dubbs process with an oil temperature in the cracking tubes B at the lower part of the illustrative temperature range, heat would have to be supplied to the oil in its passage through the vaporizing tubes C (III, 1088). In its brief (R. Br. 46), respondent says that when operating within the lower part of this range "it would be necessary to supply mild heat to the C tubes in order to maintain the oil therein at a cracking temperature (Smith, III, 1088). This is because heat is lost in the C tubes due to *cracking, vaporization,* and radiation." Respondent further specifies that the temperature in the C tubes must be maintained *the same* as that reached in the B tubes (R. Br. 124). This condition, grafted upon the Dubbs operation by Smith to operate at the low limit of the temperature range, is opposed to the teachings of the Dubbs patent and to the principle of the Dubbs invention. The Dubbs patent states that

> "A light fire may be maintained under the C tubes * * * or said tubes may be heavily insulated with cel-o-cel insulating material * * * to prevent loss of heat by radiation" (VII, 3089, Patent, p. 1, lines 99-104).

The two methods recited by Dubbs are equivalents. Each functions solely to prevent loss of heat by radiation. According to the teachings of Dubbs, when the tubes are lightly fired, this is to prevent only loss of heat by radiation. This differs radically from Smith's hypothetical operation where, as respondent asserts in its brief, page 46,

> "When the oil leaves the B tubes at 750°, which is a low cracking temperature, it must be maintained at this temperature in the C tubes."

In order to *maintain* the temperature in the C tubes, it would be necessary to supply a substantial amount of heat in addition to that required to offset the heat loss by radiation, with all the attendant disadvantages and hazards of such an operation. Thus at the extreme low end of the temperature range Smith was forced to depart from and distort the teachings of Dubbs to avoid vapor generation in the B tubes and, at the same time, to obtain substantial cracking in the process. Smith's departure from Dubbs' teachings is an admission that, had he followed these teachings and avoided supplying heat to the oil in the C tubes to promote vapor generation and cracking therein, he would have been required to decrease the cracking and vapor generation in the C tubes. But had he done so he would have been forced, in order to produce a substantial yield of gasoline, to an operation wherein substantial cracking would occur in the B tubes. This, at the pressure of the illustrative example, concededly would result in substantial vapor generation in the B tubes, as taught by Dubbs.

This is evidently the reason why Dr. Brown, confining himself strictly to the teachings of the Dubbs patent, concluded that very substantial vapor generation would occur at the low end as well as at the high end of the temperature range of the illustrative run, or throughout this range (II, 656).

Petitioner has always contended, and now asserts again, that in following the teachings of Dubbs, substantial vapor generation occurs in the B tubes throughout the temperature range in the illustrative run. It has never asserted,

as respondent erroneously argues (R. Br. 104), that the claims of the Dubbs patent were narrowed by amendment and must be broadened to fit the entire temperature range of the example. The claims, properly construed, do fit the entire temperature range of the example when the teachings of Dubbs are followed and without warping and distorting the Dubbs disclosure in the fashion to which Smith had recourse in order to sustain his untenable position.

Smith's testimony has not been misrepresented.

Respondent's reckless assertions (R. Br. 54-56) that petitioner has misrepresented Smith's testimony are inaccurate and baseless. Respondent complains that on page 74 of petitioner's brief, by an incomplete quotation, Smith's testimony has been misconstrued. The quotation complained of is complete. It does not misrepresent Smith's testimony on the point in question. In the paragraph in petitioner's brief (p. 73), immediately preceding the quoted testimony and referring to this quotation, the very bottom of the illustrative temperature range, which Smith said did not fit his interpretation of the word vaporization, was excepted. The testimony which respondent suggests should be added is to the same effect.

Petitioner did say that Smith in construing the claims began by assuming a meaning favorable to his cause and rewrote the specification to fit that meaning (R. Br. 76). Respondent's argument that this was justified because the Dubbs specification is "wholly silent" (R. Br. 55) as to the presence or absence of vapors in the B tubes to the man skilled in the art; and Smith was "naturally forced" to first turn to the claims to ascertain the meaning of the word, is most inaccurate. His proper approach

should have been to the patent as a whole, particularly the illustrative run under which, as Smith, himself a man skilled in the art, repeatedly conceded, there would necessarily be substantial generation of vapors in the B tubes save at the very bottom of the temperature range there given (II, 1150). As to the bottom of the range he sought to avoid generation in the B tubes by departing from the teachings of Dubbs in supplying heat to the oil in the C tubes.

There is no foundation for respondent's assertion (R. Br. 55) that in the quotation appearing at page 77 of petitioner's brief, an attempt was made to gain some advantage from "poor abstracting." As evident from the quotations taken from the original record, appearing in respondent's brief (R. Br. 55-56), the abstract quoted in petitioner's brief was accurate and the quotation correct. Smith plainly said that "taking the patent as a whole" substantial vaporization would occur in the B tubes at the indicated pressure. The testimony added to petitioner's quotation by respondent (R. Br. 56), in which Smith said that the "Dubbs patent *calls* for a liquid phase cracking", evidently has reference to Smith's interpretation of the word "vaporization" in the *claims* thereof, since he repeatedly contended that this word "vaporization" in the claims connoted vapor generation. Respondent seems to complain because petitioner did not endeavor to clarify Smith's testimony or to reconcile the vacillations of this witness (R. Br. 100).

In view of what has been said by respondent (R. Br. 57), the testimony of Smith relied upon at page 100 of petitioner's brief is quoted in full (III, 1071):

> "Now of course the word 'vaporization' often is applied to an operation where you do have both

> the vaporization itself and a separating or liberating step in the sense of segregation or passing off but the vaporization refers to the formation step of that operation."*

As evident from Smith's cross examination on this point (III, 1163), he conceded that in the industry the word "vaporization" is commonly applied to operations in which both vapor generation and vapor liberation occur, but consistently qualified this statement by saying that vaporization did not include liberation as a necessary step thereof. This qualification expressed Smith's opinion. It is not the view of the industry in which the word is commonly used.

Respondent's analysis of the Dubbs specification, with respect to the function of the C tubes and the meaning of the word "vaporization" derived therefrom, is incorrect.

Respondent seems to be greatly disturbed by two phrases of the specification of the Dubbs patent (p. 1, lines 78-83, and p. 2, lines 40-4) both of which refer to the C tubes and describe what occurs therein in paraphrase language, leading, as we have demonstrated in our main brief (P. Br., 79-80), to the inescapable conclusion that "liberation" and "vaporization" are used in the Dubbs patent as synonyms.

When respondent analyzes the patent specification with particular reference to the meaning of the word "vaporization" (R. Br., 43-4), it carefully avoids placing the two

*It will be recalled that Smith, in the interests of the respondent, consistently used the word "vaporization" to mean generation.

phrases in juxtaposition. Moreover, respondent does not compare these two phrases, which describe like acts in like surroundings, but compares one of these phrases with a phrase of the patent directed to a description of different acts in a different environment. The same misconstruction is repeated in the part of respondent's brief entitled "argument" (R. Br., 110-1).

Indeed, when respondent (R. Br., 109) lists the parts of the patent upon which petitioner relies to show that in the patent "vaporization" means "liberation," it conveniently omits quoting one of the two phrases in question—that appearing in the patent, page 2, lines 40 to 44.

The Dubbs claims were not amended to include the phrase "without substantial vaporization" to distinguish the Dubbs invention from the prior art.

Respondent asserts (R. Br. 48-52) that the phrase "without substantial vaporization" was inserted in the Dubbs claims to distinguish the Dubbs invention from the patents to Edwards, Smith and Trumble. It contends that the file history of the Dubbs application establishes that the Patent Office refused to recognize patentability of the clean circulation principle of Dubbs and that the aforesaid limitation alone distinguished the claims from the prior art. In our main brief (P. Br. 92-96), we have demonstrated that respondent's argument is flatly rejected by the file wrapper where the vitalizing feature of the Dubbs process was emphasized as clean circulation and where the disputed phrase was not mentioned in the proceedings leading to the allowance of the application.

Respondent bases its entire argument on claims 4 and 5 of the Dubbs patent and the proceedings leading to their grant. It contends that these claims find complete response in the disclosure of the Trumble patent unless the disputed phrase "without substantial vaporization" is construed to mean "without substantial vapor generation." From this it concludes that the word "vaporization" must mean vapor generation in claims 4 and 5 and that it cannot have a different meaning in the remaining claims. Consequently, it draws the conclusion that in all the Dubbs claims vapor generation is prevented in the cracking tubes B.

We will first discuss claim 5. The language of claim 5 clearly spells clean circulation. It requires that the oil shall be passed in "a stream in an advancing direction from an inlet point [the inlet to the B tubes] to a discharge point [the discharge of the residue from the C tubes] *separated* and entirely *disassociated* from the inlet point." The words "separated" and "entirely disassociated" are most significant in meaning. They expressly exclude any connection between the residue-discharge from the C tubes to the inlet point of the B tubes, other, of course, than the communication through the B and C tubes. This language definitely excludes the return of any residue from the C tubes to the inlet of the B tubes. It is in this respect that the claim sharply distinguishes from the cyclic systems of Trumble and Edwards. To distinguish the claim from Trumble, where vapor generation occurs in the cracking coil, it is not necessary that the word "vaporization" mean vapor generation.

Moreover, the language of the claim rejects respondent's contention that the word "vaporization" connotes vapor generation. Continuing, the claim states:

> "* * * affording a vaporization space above the stream during the second stage of the travel thereof to said discharge point [the vaporizing tubes C]."

As stated in our main brief (P. Br. 78, 80), generation of vapors cannot take place in a space above the oil stream, and the word "vaporization" there used necessarily connotes liberation. This argument is not answered by respondent's empty suggestion that the "vaporization space" recited in the claim is but an instance of "Dubbs' carelessness in the use of language" (R. Br. 112). Since the word "vaporization" in claim 5 necessarily means liberation, the same word appearing in the other claims of the Dubbs patent must have the same meaning.

Claim 4, in varying expression, is likewise limited to clean circulation. The claim requires "passing in an advancing direction a continuous stream of oil through a heating zone" and "discharging from the chamber substantially continuously a quantity of the residue proportional to the amount of oil supplied to the heating zone and said vaporization." These two limitations in the claim spell clean circulation. In this way the claim patentably distinguishes from the cyclic system of the Trumble and like patents.

The file history of the Dubbs patent offers complete confirmation of petitioner's interpretation of the two claims. In the remarks accompanying the amendment of April 14, 1921 (IV, 1540) wherein claims 4 and 5 were inserted, it was said:

> "The process disclosed in the Edwards and Smith patents are radically different from that disclosed in the present application, it being sufficient to note that in each, the material under treatment travels in a

cyclical path so that at least a portion of the separated carbon is returned to the cracking zone. * * *

"Neither of these patents suggest passing the oil in an advancing direction from the inlet end of the heating zone through such zone into a suitable vaporizing chamber with the vapors passing out of the chamber to be collected, avoiding the mixing of the precipitated carbon or residue after vaporization with the oil in or to be passed through the cracking zone."

These claims were then formally allowed. It is to be noted that the phrase "without substantial vaporization" was not referred to by Dubbs in distinguishing the subject matter of the claims from the prior art cited; *contra*, clean circulation was emphasized as the vitalizing feature of the claims.

Finally, if it be concluded that claims 4 and 5 do not distinguish from Trumble or Edwards by the limitation of the non-return of the residue to the inlet of the cracking tubes, then they are broader than the Dubbs invention, which is confined to clean circulation, and may be invalid for that reason. But this fact could not affect the other claims of the Dubbs patent, including typical claim 7, which do in this regard clearly distinguish from Trumble and the other prior art.

Petitioner's meaning of the word "vaporization" is not refuted by the qualifying adjective "substantial".

At pages 45 and 46 of respondent's brief it is said that if the word "vaporization" in the Dubbs claims connotes separation or liberation of vapors from the oil the qualifying adjective "substantial" in the disputed phrase "with-

out substantial vaporization" is meaningless. Respondent contends that a condition, where a substantial number of vapor bubbles remain unliberated in the oil stream while an insubstantial number separate or pass off from the liquid, cannot exist.

Here again respondent's argument is based upon a false premise. The testimony of respondent's expert, cited in support of this erroneous argument, relates to the rise of vapor bubbles formed in a body of liquid contained in a vessel with a vapor space above the surface of the liquid and to what may occur in heating viscous molasses (III, 1096). These conditions are in no way comparable to the conditions prevailing in the cracking tubes B of Dubbs. In these tubes the relatively non-viscous liquid is not quiescent. The vapor and non-volatilized liquid coursing through these tubes are in a turbulent condition and in the form of a foam. Nor is there a vapor space above the liquid in these cracking tubes.

In the Dubbs claims the qualifying word "substantial" was used to include a condition in the B tubes where there might be a localized and temporary release of a negligible amount of vapor from the oil film adjacent the surfaces of the tubes—or, as stated by Dr. Brown, where the point where separation would take place is approached when, momentarily, there might be a slight release of vapor from the foam (II, 699). If this inconsequential release of vapor did occur, such vapor would soon thereafter, due to the increased velocity of the mixture, be again enveloped in the foam. Consequently, the use of the word "substantial," a word so commonly employed in patent claims, was undoubtedly included in the Dubbs claims for the purpose of preventing anyone from asserting that an operation in which

this inconsequential and temporary release of vapors occurred averts literal infringement of the Dubbs's claims.

Petitioner has not been inconsistent with respect to the meaning of the word "vaporization" in the Dubbs patent.

The implications which run through respondent's brief that petitioner has not been consistent with respect to the meaning it ascribed to the word "vaporization" in the Dubbs patent are entirely unwarranted (R. Br. 41, 94, etc.)

Petitioner in this case has never sought to change the meaning which it asserts the Dubbs patent ascribes to the word in question. Petitioner's main brief made it clear that this meaning is the liberation, or passing off, of the vapors from the body or stream of liquid in order to form a vapor phase above the oil body (P. Br., 78-84). This meaning is in strict conformity with that which Dr. Brown gave to the word as he found it in the Dubbs patent, as quoted in our main brief at p. 84, or in the last sentence of the quotation appearing in respondent's brief, page 94.

The purport of respondent's weak and unjustified argument appears to be to convince this Court that the word "vaporization" can have but one meaning, namely "vapor generation".

To accomplish this purpose, respondent advances the following propositions:

It states (R. Br. 94) that "in its Brief before this Court petitioner has completely repudiated its expert's views." To support this conclusion, respondent relies on an incorrect emphasis of Dr. Brown's testimony and on a misleading construction of the evidence.

First, respondent quotes Dr. Brown's testimony, which stated that the "passing off of vapors as from a tea kettle" is not the meaning of the word "vaporization" in the Dubbs patent. But in so quoting Dr. Brown, respondent, by partial emphasis, seeks to focus this Court's attention only on the words "passing off" in order to be able to say that the expression used by Dr. Brown is the same as similar words used in petitioner's brief. Petitioner is, and has always been, in complete agreement with the full statement by Dr. Brown. Petitioner never advanced that the word "vaporization" in the Dubbs patent connoted a comparable operation involving the passage of the separated vapor *from the C tubes* to the vapor lines D and aerial system.

When full import is given to the complete language used by Dr. Brown in the quotation, and to petitioner's statements (P. Br. 70-84), it is obvious that there is no disagreement between petitioner and its expert. As stated, Dr. Brown and petitioner have always asserted that "vaporization" as used in the Dubbs patent connotes the liberation, or passing off, of vapor from the oil body to form a vapor phase above the oil body, as occurs in Dubbs's C tubes.

Respondent next emphasizes Dr. Brown's statement, in another part of the same quotation, that the word "vaporization" in the Dubbs patent does not "mean liberation of individual molecules so as to form bubbles of vapor *within* the liquid." It also refers to the testimony of its expert Cady to the effect that the very change of state or generation of vapor may constitute a form of liberation even though the vapor molecules *remain within* the liquid (R. Br., p. 94). On the basis of these two propositions, respondent infers that petitioner, when it used the expression "pass off

in vapor," in support of the meaning which it ascribes to the word "vaporization" in the Dubbs patent, intended to designate by those words molecular liberation or conversion into vapor, in disagreement with Dr. Brown.

This absurd view is completely rejected by petitioner's brief (P. Br. 19, 70-84).

Respondent's assertion that petitioner and its expert have disagreed on the questioned word in the Dubbs patent is accompanied by a more general but futile effort on respondent's part to show that all the definitions found in the dictionaries and text books cited by petitioner (P. Br. 101-2, and Appendix) mean vapor generation, irrespective of the wording of these definitions. Thereby respondent erroneously seeks to convince this Court that the word "vaporization" has only *one* accepted meaning, that of vapor generation.

In this endeavor, respondent says (R. Br., 41, 94)—evidently relying on the testimony of Cady—that the "passing off" of vapor is the change of state itself or generation of vapor.

If the expression "to pass off in vapor" and other phrases to that effect found in dictionaries and text books connoted vapor generation, these reference books, we submit, would not have separated the definitions under "vaporize" (the verb to which one is referred by these books to find the definition of the name vaporization) in two distinct parts.

Furthermore, respondent's fallacious argument is rejected by the definitions given in Webster as "to cause to become * * * dissipated" (P. Br., Appendix vii), and in Hawkins as "to pass off in vapor, to escape and be dissipated either in visible vapor * * *" (P. Br. Appendix viii).

If the definitions in these dictionaries and text books are given their plain significance, it is obvious, as petitioner contends, that the word "vaporization" has not the sole meaning for which respondent contends and that an accepted meaning of the word is the liberation of vapor from the oil body to form a vapor phase above the oil body.

That this is so is apparent from Judge Holly's fact statement (VI, 3047, 3059) that "the generally accepted meaning of the word 'vaporization' is vapor generation." There, Judge Holly refused respondent's contention that generation is the word's *only* meaning. Petitioner's contention is also supported by Judge Lindley's opinion, finding that if the Dubbs patent is valid, it is infringed by respondent's operation. In such infringing operation molecular liberation or vapor generation occurs, but vaporization—giving this word the meaning which it has in the Dubbs patent and which petitioner and its expert have ascribed to it—does not occur.

Finally, if the dictionary and text book definitions are given their plain import, if Dr. Brown's testimony with respect to the use of the word vaporization in the Gyro process and Smith's testimony, with respect to the designation of processes where generation and liberation take place as vaporization processes, be considered, respondent's reckless statement (R. Br., p. 111) that "no one ever heard of the meaning advanced for the word by Petitioner until someone in Petitioner's camp concocted it in order to have a theory of infringement in the *Root* case," is obviously untrue.

The Dubbs patent adequately teaches the maintenance of a foam in the B tubes.

We have at some length in our main brief discussed the teachings in the Dubbs patent of the velocity necessary to prevent segregation of vapors from the liquid oil in the B tubes (P. Br. 105-10). To what is there said we may add the following:

If the disputed word "vaporization" in the claims of the Dubbs patent is construed as contended for by petitioner, this obviously is in and of itself sufficient to enable the man skilled in the art to maintain the desired foamy condition of the oil and the vapors in the cracking tubes. As we understand it, respondent does not deny this. Respondent complains (R. Br. 99-101) that the Dubbs patent does not state the exact maximum proportion of vapor to liquid beyond which the foam will break and separation of the vapor from the liquid will occur. To the man skilled in the art, this may be determined without difficulty. Dr. Brown had no difficulty in doing so. He testified that as early as 1919 it could be determined by calculation, but perhaps not quite as accurately as at the time he testified. His actual testimony was (II, 724) that in 1919 "data was available; it perhaps could not be computed quite as accurately as we do now, but that could be computed."

The figure of 99.9% of vapor which Dr. Brown testified would be approximately the maximum ratio of vapor to liquid permissible to prevent vapor separation was not, as respondent suggests (R. Br. 100), an arbitrary one.*

*The Court needs only remember the considerable volume of air which may be contained within the thin film of liquid in a soap bubble before the bubble bursts, to justify the apparently large ratio of vapor to liquid which Dr. Brown testified can be attained before vapor separation occurs.

Respondent's footnote on the same page concedes that this figure was determined by calculations which respondent made no attempt to discredit.

The fact that this figure is near 100% is no justification for Smith's attempt to ridicule Dr. Brown's testimony on the point (R. Br. 99) by stating that oil could be vaporized to 100% without ever separating vapors from the oil. In order to assume that 100% vapor could be obtained without vapor separation, Smith necessarily had in mind oil characteristics or operating conditions entirely different from what is stated in the Dubbs patent and formed the basis of Dr. Brown's calculations and testimony.

There is no serious inconsistency, as respondent suggests (R. Br. 102), between the testimony of Dr. Brown and the testimony given by Dr. Lewis in the *Root* case as to the conditions prevailing in the cracking tubes B of Dubbs. Both testified that the vapor and liquid must be in intimate mixture and that there could be no separation or segregation of vapors from the liquid. Dr. Lewis, in the testimony to which respondent refers, made this clear by the statement that the oil and vapors were in "intimate mixture without any separation or segregation" in the B tubes (78 F. (2d) 991, at p. 997).

Since respondent's operation appropriates the "clean circulation" principle of the Dubbs patent, there is infringement if the claims read on such operation.

Respondent argues (R. Br., 123-128) that even though the accused process falls within the language of the Dubbs claims, infringement is avoided. The same argument was rejected by the courts below. In support of this contention it is asserted that the accused process does not embody the

principle of the Dubbs invention. This obviously is incorrect.

In its brief (R. Br., pp. 124-5) by parallel columns an effort is made to establish that the essentials of the Dubbs patent, regardless of claim limitation, are not present in the accused operation. The "deadly" parallel is inaccurate and misleading. In describing in separate paragraphs alleged operations of the Dubbs patent, respondent has not adopted the features of the patent as plainly described therein. Respondent has distorted the teachings of the patent and formulated a series of fictitious steps, embodying all the departures of its expert Smith from the patent disclosure, and for which it says there is no counterpart in its operation. In this comparison, respondent repeats its frequently stated contention that in the Dubbs patent no substantial cracking and no substantial vapor generation occurs in the cracking tubes B. Such a contention is a red herring. It can have no value.

We are in agreement with the proposition of law stated by respondent (R. Br., p. 123). But it has no application here. Infringement cannot be averted by mere changes in shape, form or degree, so long as the accused process appropriates the essentials or the principle of the invention of a patent in suit. Respondent's operation has slavishly done so. It is bottomed squarely on "clean circulation", the principle of the Dubbs invention. This underlying principle of Dubbs, common to respondent's operation, involves in a mixed phase process the returning of the reflux to the inlet of the heating and cracking coil and the withdrawal of all residue without the return of any part thereof to the coil. This, respondent in its brief (R. Br., p. 125), at least tacitly concedes.

The decision of the Tenth Circuit Court of Appeals in *Texas Co.* v. *Anderson Pritchard Refining Company,* 122 Fed. 2d 829 (R. Br., p. 127) can be of no benefit to respondent here. It is unimportant that the court in that case did find that the principle of the Behimer patent as set forth therein was such as to make the asserted two-step procedure an essential of the Behimer invention, and confined the claims to such an operation. The court did not, as respondent infers, intimate or suggest that the Dubbs patent was confined to such a procedure. Significantly the court did hold in that case that Behimer surrendered clean circulation in the interference proceedings to Dubbs. It is not surprising, under these circumstances, that the mere improvement patent of Behimer was given a narrow construction and restricted to the two-step operation which presumably was found to be an essential thereof.

Respondent has misstated the effects of pressure in a vapor-liquid phase (mixed phase) process.

Respondent incorrectly assigns to the use of pressure a single and the same benefit in both coil cracking vapor phase processes and in liquid-vapor phase operations (R. Br. 27). It is true that the benefit to which respondent refers (economy on length of coil by compressing vapors into a smaller space) is present in both types of processes. But in liquid-vapor phase operations such as respondent's or Dubbs's process, pressure has additional benefits. As pointed out by Dr. Brown, in such process, pressure decreases the generation of vapors and allows the oil to be heated to a higher temperature with less generation of vapors; it prevents the danger of separation of the vapors from the liquid in the heating tubes and maintains the foamy

condition of the vapor and of the liquid more readily (II, 660). One result of the decreased vapor generation and of the compression of the vapor is that for a given length of coil and the same quantity of oil charged thereto, the time element, therefore the degree of cracking, can be varied by varying the pressure.

If the different effects of pressure in these processes are considered correctly, the vapor phase process cannot be put in the same class with the liquid-vapor or mixed phase process.

The foregoing shows that respondent's criticism of the District Court in the *Root* case is unjustified (R. Br. 27, 130). When it said that cracking is the decomposition of petroleum "by heat and pressure", the Court must have taken a practical view of the processes involved; it understood rightly that pressure and time element were closely interrelated, and used pressure as a criterion of time.

Finally, respondent (R. Br. 130) evidently misunderstood or misconstrued Judge Nields' statement (6 F. Supp. at p. 767) that

> "This range of heat in the cracking tubes is cracking temperature and at the stated pressure would inevitably result in cracking".

Judge Nields obviously meant to discard respondent's construction of the Dubbs patent whereby the cracking is only initiated in the B tubes; the Court meant that under the conditions of the illustrative run, including the effect of the pressure stated therein on the extent of vapor generation and on the volume of the generated vapor, cracking would occur in the B tubes of the patent.

III

BEHIMER DEFENSE

This defense, as presented in the courts below, was dual in character, including (1) an asserted prior use of the Behimer scheme by The Texas Company in 1917 and (2) prior invention by Behimer based upon his application for patent having an effective filing date of November 21, 1918, which matured in patent No. 1,883,850. Although the two defenses are inseparable and both must stand or fall together, respondent here has dropped the first defense, obviously to avoid consideration of the sterile and abortive character of Behimer's experimental work, and to avoid endowing the Behimer patent with the consequent infirmities.

Concededly the disclosure of the Behimer patent is based solely upon Behimer's alleged prior experimental use. If the experimental use be established to be sterile or abortive, there is no constructive reduction to practice. We therefore propose first to show that the experimental work was unsuccessful and abandoned; and that Behimer, with the entire technical staff of The Texas Company, whose expert knowledge and practical experience were far superior to those of the ordinary skilled worker in the art,* labored in vain for five years in an effort to cure his scheme of its infirmities. We will then consider the Behimer patent, bottomed as it must be on the unsuccessful and abandoned experimental work.

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*It is idle to suggest (R. Br. 79-82) that the solution of Behimer's problem was obvious. Were this true, it would not have eluded the skill of Behimer and of the other Texas Company experts for five years.

The defense of prior invention and prior use by Behimer and The Texas Company was developed by respondent at great length at the trial. Testimony was given by Behimer (I, 290-347; II, 868-959) and by a score of witnesses from The Texas Company. Voluminous letters, drawings, sketches and records were produced (I, 123-68, 176-243; II, 969-1022; III, 1023-55). All this evidence served merely to establish that Behimer and The Texas Company, notwithstanding persistent and earnest efforts, failed for five years to solve the carbon problem or attain clean circulation. The District Court discussed the evidence at length and, in rejecting the defense, said (40 F. Supp. 575):

> "He [Behimer] conceived some of the steps necessary to produce the desired result. He had worked out a method of heating the oil to a cracking temperature in one set of tubes, transferring this heated oil to a separate chamber where cracking should take place without the application of additional heat and carrying the vapors to a condensing chamber. *But here he was balked.* It was necessary to the operation of his system as he conceived it (and as Dubbs worked it out) to return the reflux to the heating coil and this he did not know how to do. * * *
>
> "Behimer at this time was in the employ of the Texas Company and had the use of all the facilities of that great corporation. He consulted with Holmes, president of the company and one of the outstanding engineers in the oil industry. Experimental plants were erected by the Texas Company, but abandoned. As Behimer testified there was a 'joker' in his conception of the process, he did not know of any means of returning the reflux to the heating coils.
>
> * * * * *

> "The failure of the Behimer system to operate was not the result of carelessness in construction, but was due to a fundamental defect, a lack of any means, conceived by Behimer, of successfully returning the reflux to the heating coil."

The Court of Appeals left these findings undisturbed. From 1916 to the summer of 1921 Behimer never had a conception of a complete and operative idea. His experimental work during this period was fruitless, and his patent consequently exhibits a worthless and inoperative scheme.

(a) *The "joker" in Behimer's concept, in his experimental work and in his patent.*

An essential of the process in issue involves the cycling or circulation of reflux condensate through an elongated cracking coil. The highly heated volatile condensate must be forced through the coil under a pressure sufficient to overcome the substantial frictional resistance opposing its passage. As the District Court said, Behimer conceded that the joker in his concept, a joker which persisted through all his experimental work, was the lack of any means for cycling the reflux through the elongated coil.

To be effective as a defense, a prior conception or use must be shown to contain a complete and operative idea or device embodying each and every feature of the claims of a patent in suit. The rule was stated in *Coffin* v. *Ogden*, 85 U. S. 120:

> "The invention or discovery relied upon as a defense, *must have been complete, and capable of producing the result sought to be accomplished*; and this must be shown by the defendant. The burden of proof rests upon him, *and every reasonable doubt should be re-*

solved against him. If the thing were embryotic or inchoate; if it rested in speculation or experiment; if the process pursued for its development had failed to reach the point of consummation, it cannot avail to defeat a patent founded upon a discovery or invention which was completed; while in the other case there was only progress, however near that progress may have approximated to the end in view. * * *".

With the foregoing legal principles in mind, we turn to the acts or work upon which the Behimer patent is concededly bottomed.

Behimer, referring to the disclosure of his scheme to Donaldson (patent attorney of The Texas Company), in the summer or fall of 1916, testified that he then told Donaldson that he had no concept "at that time of any means for giving this operation expression" (II, 937). He "didn't know of any means, jet or any other means" for returning the reflux through the heating coil (II, 937). Although his scheme was incomplete and known to be so, Behimer suggested to Donaldson that it "would be a good thing for a patentable scheme, and I thought it was something that would eventually work out" (II, 937),—a startling admission of Behimer's erroneous view of the purpose of the patent laws.

An equally vague and incomplete disclosure was made to Holmes. Behimer testified that in disclosing his process to Holmes, he told the latter he "didn't have any means to carry it into execution" (II, 938).

Smith conferred with Behimer in August or September of 1916 for the purpose of preparing a drawing to illustrate Behimer's scheme. It was on this occasion that Behimer told Smith that the "joker" (II, 880) in his idea

was that he did not know of any way to force the highly heated volatile reflux at a high pressure through the cracking coil. Smith suggested to Behimer that an injector or jet might be a suitable means for cycling the reflux (II, 881) and might offer a cure. Thereafter, in the summer of 1917, a small laboratory unit, identified as Experiment 8, including a jet, was erected by The Texas Company. It is upon the performance of this experiment that the Behimer defense of prior invention is bottomed.

From the mouths of Behimer and Holmes, and from the contemporary reports of The Texas Company, it plainly appears that the few sporadic test runs of Experiment 8 were failures, the experimental work was abandoned as sterile or fruitless and the unit was dismantled.

The first five runs with the experimental unit were in the nature of try-outs of the apparatus without any results upon which any reliance may be placed.

The next four runs, 6 to 9 inclusive, were made with gas-oil as the charging stock.* The results of the runs are summarized in PXs 7 and 8 (III, 1325-6). The summary of run 6 shows a gasoline yield of but 16.66% based on the charge. This is considerably lower than the yield of the Burton and Burton-Clark stills operating at that time. Even with this low gasoline yield, Behimer reported that the "lower tubes were carbonized" (VI, 2531).

With higher gasoline yields, carbon troubles became strikingly more acute. In referring to succeeding experimental run 7, lasting but 19 hours, the summary states that the "2 lower tubes contained considerable carbon on bottom

*Gas-oil, as previously explained, is a light distillate obtained from crude petroleum.

of tubes" (VII, 2547). Experimental run 9, the last of the Behimer runs with gas-oil, was fully demonstrative of the failure. In his own summary covering the run Behimer said:

> "This experiment, as previous experiments with Paraffin Base Gas Oil as stock, demonstrates that the lower tubes carbonize considerably and the run, consequently, is of short duration. * * *" (II, 905).

Behimer testified that he understood, as everyone so understood, that "There was only one trouble in the cracking industry and that was carbon" (II, 909). In Behimer's letter to Dodge of The Texas Company in 1921 he said that in the operation of Experiment 8 the "tubes carbonized too much" (II, 945). He further testified that in one of the runs "the lower heating tubes of the coil were almost completely clogged with carbon, forcing me to shut down" (I, 316).

Again, when commenting on the operation of Experiment 8, Behimer said the charging oil "was baked and stewed like you would in a frying pan and coked along the bottom" (II, 947) of the cracking coil. In a statement prepared for The Texas Company in 1926, Behimer said that he attributed this severe accumulation of carbon in the cracking tubes of Experiment 8 "to the stratification of the heavy residuum oil on the bottom of the tube and the vapors above" (II, 944).

There can be no doubt from Behimer's above-quoted testimony and contemporary reports that he recognized the complete failure of Experiment 8 to solve the carbon problem, which was the bane of the cracking art.

After failing with gas-oil, an effort was made to crack the still lighter kerosene. Two such runs, Nos. 10 and 11, were attempted, and likewise resulted in failure. In Behimer's conteniporary summary covering the final run, it is said (II, 944): "This experiment, as Experiment 8, Run 10, demonstrates that it is impossible to reach the conditions of rapid decomposition in this apparatus. ***".

No carbon troubles were encountered in the kerosene runs because, as admitted by Behimer, he was not "getting any cracking" (I, 339).

The failure of Experiment 8 on the kerosene runs sounded its death knell. It was dismantled, and nothing ever came of it except that, in contravention of the patent law and contrary to public poliey, it was made the basis of a patent application of The Texas Company, filed at the direction of Holmes. Yet, as Judge Holly pointed out (VI, 3043-4), The Texas Company "knew Behimer had not then conceived a workable process" and "We have here a situation where an application for a patent is filed when it is known that the method described was unworkable."

It is upon this unlawfully filed application that respondent now relies to establish prior invention.

After Experiment 8 had failed, a "pilot plant" was designed in the fall of 1917. The purpose of designing the plant was to determine if the "infirmities and defects" (II, 945) manifesting themselves in Experiment 8 could be overcome, and specifically whether it would be possible to "overcome carbon trouble" (II, 909). This plant died on the drafting board. Despite the fact that its estimated cost was only $13,000 (II, 976), a trivial sum to The Texas Company, it was never built.

The $13,000 pilot plant was not built because it contained the "joker" that had led to the failure and abandonment of Experiment 8,—the unavailability of "any suitable means to return the reflux to the heating coil" (Behimer, II, 947).

At the time that it was decided not to build it, The Texas Company proceeded with another experiment, *departing from the principle of Behimer; and failing to exhibit clean circulation*, identified as Experiment 18, at a cost in excess of $200,000 (II, 948).*

In the fall of 1917, Holmes called Behimer to New York, informed him that The Texas Company was under "a great deal of pressure" to install a commercial cracking process, and directed him to get busy "making gasoline commercially" (II, 948). As a result of this conference, work on Experiment 18 was undertaken. Experiment 18 departed fundamentally from the scheme of Experiment 8. The reflux condensate was returned directly to the large fired vertical stills, an operation which Behimer said "is not 'clean circulation'" (II, 948).

Experiment 18, conducted at a cost in excess of $200,000, involved Batteries 1 and 2, each consisting of two large vertical shell stills, and Battery 3, embodying a single vertical shell still of the same type (II, 948).

During the life of Experiment 18, as well as of a succeeding Experiment 18 (Battery 4) the reflux, save for one exception, was not returned to the heating coils, but to the shell stills or drums where it *admixed with the residual oil.*

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*The little faith that The Texas Company had in the Behimer scheme may be measured by its refusal to spend $13,000 upon it and its decision to spend $200,000 on another process.

It appears that on one occasion, for a single run in February 1919, an attempt was made in Experiment 18, Battery 3, to return reflux to the cracking coil by a jet, the same device that had failed in Experiment 8. The experiment met the same fate as Experiment 8. The run was unsuccessful, the jet pump was removed and no attempt was ever thereafter made to return the reflux to the cracking coil (II, 950).

Experiment 18 was followed by the erection of 24 commercial stills by The Texas Company in 1920, at an expense in excess of $3,000,000 (II, 948-9). Each still was patterned after Experiment 18 wherein the reflux condensate was returned to the enlarged vertical stills or drums and there mixed with the residual oil (II, 949). This admittedly is not clean circulation.

Holmes testified that from Behimer's inception of his incomplete scheme The Texas Company had persistently searched for some operative means for returning reflux to the cracking coil. In addition to consulting experts of The Texas Company, Behimer had roamed the country contacting experienced engineers in a futile or vain effort to solve this problem (II, 920-1, 924 and 927). Holmes said that the reflux in the commercial units was returned to the vertical stills containing the residue "because we had not found a means for forcing—this reflux through the preheater" and that The Texas Company "had at that time no means or facilities to force the reflux back against the preheater pressure" (II, 978).

Thus, at this late date, years after Behimer began his experimental work, the problem of clean circulation had not been solved at The Texas Company. Neither Behimer, Holmes, the array of experts of The Texas Company, nor

the many other experienced engineers in the oil industry that Behimer had consulted, had been able to offer a solution to the baffling problem that the District Court found (VI. 3043) "balked" Behimer. This history, not mere prophecy or argument, completely refutes the sophistical arguments advanced by respondent (R. Br. 78-9) to the effect that the infirmities in the Behimer scheme could be corrected by the skill of the calling or that a solution of his problem might be found in the prior art.

This is an appropriate occasion for application of the famous aphorism of Mr. Justice Holmes: "A page of history is worth a volume of logic," *New York Trust Co.* v. *Eisner*, 256 U. S. 345.

Contrary to respondent's inference (R. Br. 79) there was no item in the prior art disclosing a high hydrostatic head for imposing upon the hot volatile reflux pressure adequate to propel the same through an elongated heating coil and to overcome the frictional resistance offered to the passage of such material through the cracking coil. This was novel in the oil cracking art when Dubbs entered the field, notwithstanding respondent's argument to the contrary (R. Br. 133).

Nor was there anything in the art, prior to the advent of Dubbs, exhibiting any way or means for solving the problem that had baffled Behimer and his associates.

Respondent infers that the patents to Burton and Humphreys teach a hydrostatic head that might have been successfully used in the Behimer process in lieu of his unworkable pump (R. Br. 79). These patents contain no such teachings. Respondent in its brief concedes that in these patents the reflux is returned to a shell still where "no problem of frictional resistance existed" such as is present in the clean circulation process (R. Br. 79).

Respondent next suggests that Behimer testified that the use of gravity to return reflux was evident to him, but that he was not interested in such a procedure (R. Br. 80). Behimer did, by oral testimony, infer that he had thought that a hydrostatic head might be used in his scheme. But his self-serving declaration has no evidential value since it stands wholly uncorroborated and is discredited by the documentary evidence. Judge Holly disposed of this contention in the following language (F.F. 25, VI, 3057):

> "Behimer's testimony that he had the idea of returning reflux by hydrostatic pressure is uncorroborated and is negatived by the fact that on one of The Texas Company drawings, he decreased the elevation of the dephlegmator."

It is elementary that the uncorroborated testimony of an inventor may not be accepted as establishing prior invention, *Oliver Machinery Co. v. Gellman*, 104 F. (2d) 11, citing many cases.

The commercial operation of the Holmes-Manley stills, *without clean circulation*, continued uninterruptedly until the summer of 1921 (II, 930-1). At this time The Texas Company began converting the commercial stills to the clean circulation principle, using a surge pump for forcing the reflux through the cracking coil (II, 969). This was the first time that Behimer or The Texas Company ever achieved clean circulation. The date is, of course, too late to have any legal significance in so far as the Dubbs patent is concerned.

While Behimer, with all the technical and financial resources of The Texas Company at his command, was groping in the dark for a solution of his baffling problem,

Dubbs had succeeded. He supplied the spark of genius, making the clean circulation process possible by utilizing a high hydrostatic head for imposing upon the hot volatile reflux the necessary pressure to insure passage through the elongated cracking tubes against the frictional resistance developed therein. His revolutionary invention promptly went into commercial use on an enormous scale. From 1919 to 1926, 99 commercial Dubbs cracking units were installed and operated, in which the reflux was returned by hydrostatic pressure, or gravity head, as distinguished from the unworkable jet (II, 612-3). These units remained on-stream as long as 28½ days, with a gasoline yield of 48% based on the charge (II, 615).

Under these circumstances respondent is driven to the argument that no more than mere mechanical skill was required to convert Behimer's failure to success or to cure the fatal infirmities in the Behimer patent. Judge Holly, in holding that the present case is not appropriate for the application of this familiar refuge of the infringer, observed (40 F. Supp. 575):

> "It has been suggested that even if the jet pump was not successful still nothing more than ordinary mechanical skill was necessary to find a method of returning the reflux. But the fact remains that neither the Texas Company headed by an outstanding oil engineer and with a great staff of experts, nor Behimer, a man of great ability, could or did think of a way. The method of returning the reflux by hydrostatic pressure seems simple now. It might seem to a court that ordinary mechanical skill would suggest that method, but it is not for the court now to say, in the face of the fact that the method did not occur to men of great skill who were

earnestly working on the problem, that just ordinary mechanical skill was all that was necessary. Barbed Wire Cases, 143 U. S. 275, 283, * * *."

Thus, quite apart from the fact that the substitution of such an effective and operative means for the worthless jet disclosed in the Behimer patent, is opposed to the rule of this Court in *Coffin* v. *Ogden, supra*, and to the rule that the patent law recognizes no such thing as a reduction to practice *nunc pro tunc*, it is apparent that the elevated hydrostatic head was not a part of the prior art available to Behimer for the purpose of curing a demonstrated and vital defect in his scheme.

(b) *The Behimer patent is inoperative and ineffective for anticipatory purposes.*

All that has been said in respect to Behimer's abortive and abandoned experimental work applies to the Behimer patent, which is concededly based upon Experiment 8.

This Court has consistently refused to sustain a patent directed to an invention having no practical value or utility, *Beidler* v. *United States*, 253 U. S. 447. With like consistency it has refused to invalidate a meritorious patent upon an item of the prior art possessing no practical utility. *Agawam Woolen Co.* v. *Jordan*, 74 U. S. 538, *American Wood Paper Co.* v. *Fiber Distintegrating Co.*, 90 U. S. 566.

Behimer repeatedly admitted that when his patent application was filed in 1918, he knew of no useful or practical way of forcing reflux through the heating coil. Judge Holly rightly observed that The Texas Company caused the Behimer application to be filed "though it knew Behimer

had not then conceived a workable process" and that the situation here is one where the patent application was filed when it was known that "the method described was unworkable" (VI, 3043-4). The purpose of The Texas Company in thus filing in violation of the Patent Statutes and of public policy was, as observed by Judge Holly, to have this abortive or sterile scheme (VI, 3045) "on record as an anticipation" as against some subsequent and worthy inventor. In concluding that the Behimer application did not constitute an effective constructive reduction to practice of the Dubbs invention, the District Court said (VI, 3044):

> "If the application for the patent is to constitute reduction to practice, the specification must be such as to enable one skilled in the art to construct a workable apparatus. Curtis Aeroplane & Motor Corporation v. Janin, 278 Fed. 454, 457.
>
> "One is not the discoverer of a new process until he has worked out all the steps necessary to produce the result he desires. To hold otherwise would be absurd. Behimer in his application stated that the reflux should be returned to the heating zone, but he did not state how that could be accomplished and he did not then know.
>
> "His application and his drawing accompanying it shows [sic] a jet pump whose function is to return the reflux to the heating coil, but in his testimony admits that the jet pump did not work. We have here a situation where an application for a patent is filed when it is known that the method described was unworkable."

The evidence fully supports the District Court's finding. Behimer testified (II, 951) that when he filed his original application for patent on November 21, 1918, he

"intended to incorporate and did incorporate in that application" Experiment 8, which had been abandoned in 1917 as worthless. The patent application, according to Behimer (II, 951), "was based on that set-up." Behimer further testified:

> "When I filed the application in 1918, I did not know of any satisfactory means for returning reflux to the heating coil, that would operate on a still of practical size. * * *" (II, 951).

In condemning the jet, the only means ever known to or ever used by Behimer in his unsuccessful efforts to return the reflux, he testified that "we didn't feel we knew how to do the job and the jet pump was 'out'" (II, 951).

Holmes, when he directed the filing of the application bottomed upon Experiment 8, knew that the scheme was a demonstrated failure and had been abandoned. He knew that as late as 1920 Behimer was still searching for some operative and efficient way or means to circulate the reflux through the cracking coil. He testified that the reflux in the 24 large commercial units installed in 1920 was returned directly to the vertical stills containing the residue only because his company had found no "means or facilities" to force the reflux through the cracking coil (II, 978).

Finally, respondent erroneously contends that the Behimer application, as filed, contains a more adequate disclosure of a hydrostatic return of the reflux than is found in the Dubbs patent (R. Br. 79). The Dubbs patent clearly discloses an elevated overhead aerial system providing the necessary and desired hydrostatic head to force the reflux through the heating coils. The Dubbs specification plainly teaches in several instances (IV, 1215-6) that from the

elevated aerial system a suitable "drainage line" is provided for admitting the reflux to the cracking tubes B of the apparatus, and that such reflux condensates produced in the aerial system and aerial condenser G' are "automatically drained back", entering the cracking tubes B to pass therethrough under such hydrostatic pressure.

In the Behimer patent, a hydrostatic head pressure is not employed for impelling the reflux through the cracking coils. The head of liquid accumulating in the pipe 17 is not intended to accomplish this purpose. This head of liquid feeds the jet and it is the "high pressure at which the oil in the charging line passes the jet" (VI, 2659) that is relied upon to propel the reflux through the heating coils,—the scheme demonstrated to be unworkable. It is the jet that is relied upon in the Behimer application as compared with the hydrostatic head in Dubbs. And the jet alone was used in Behimer's work upon which the patent application was based.

To this may be added Behimer's concession that when he filed his patent application he had no concept of any satisfactory means for returning reflux to a heating coil in a still of practical size (II, 951).

(c) *Respondent cannot be benefited by the pump of the Thompson patent in establishing prior invention by Behimer.*

Respondent also contends (R. Br. 81-2), apparently as a last line of defense, that Behimer's problem was actually solved in the year 1921 when he received a circular from the Dow Pump & Diesel Engine Company advertising a surge pump devised by one Thompson (R. Br. 81). The Thompson pump was patented in 1917, although apparently

it was not known to Behimer at the time of his experimental work. Respondent, therefore, urges a *nunc pro tunc* grafting of the Thompson pump on to inoperative Experiment 8, or its counterpart in the Behimer patent, so as to spell out an anticipation for Dubbs.

Such a procedure obviously collides with the rule laid down by this Court in *Coffin* v. *Ogden, supra;* but quite apart from that, the grafting is not sufficient, for the pump of the Thompson patent did not solve Behimer's problem. The District Court found that The Texas Company "did not use the Thompson pump but worked out a pump of its own device * * *" (VI, 3044). The evidence fully supports this finding. It was necessary to make material and extensive modifications of the Thompson pump to achieve success.

The surge pump, as actually installed by The Texas Company, differed from the Thompson disclosure in many fundamental respects, including the following:

(a) In the first installation made by Texas, a Worthington pump was employed (II, 1021). Instead of arranging the pump and the valve assembly as exhibited in the Thompson patent, a vertical surge line, 36 feet high, was interposed (II, 973-4). This is illustrated in DX 730. It was found to be unsatisfactory because of the chattering or vibration of the long vertical surge line (II, 974). In the next installation, a Worthington pump was again used. In this assembly, double gooseneck lines comparable in length to the 36-foot vertical lines were employed. These gooseneck lines were interposed between the motive end of the unit and the valve assembly (III,

974). This was done in an effort to avoid chattering or vibration.

(b) Even with the surge lines elevated 36 feet and arranged in double gooseneck form, it was necessary to inject cold raw oil into the surge lines so as to keep the motive end of the pump cool and lubricated.

Not one of these vital things is disclosed by the Thompson patent.

Moreover, there is no testimony establishing that the surge pump, as exemplified in the Thompson patent, would effectively function with the high volatile reflux under the high temperatures and pressures prevailing in a cracking plant.

No testimony has been offered to the effect that the pump of the Thompson patent was ever employed in a cracking unit of the clean circulation type.

Nor is there any evidence that the man skilled in the art, even with knowledge of the Thompson patent at a date prior to the filing of the application for the Dubbs patent, would recognize the Thompson pump as appropriate for use in a gasoline-making process based upon the clean circulation principle.

(d) *Conclusion.*

Respondent's counsel did not bring Behimer forward as a defense before the Delaware District Court in the *Root* case, although the issue was open to them and indeed they pleaded a division of the original Behimer application. Perhaps they did not rely upon it because they realized the cogency of the arguments whose submission to this Court

we have now completed. Having been unsuccessful in the *Root* case on the other alleged prior act, however, the respondent's counsel have now made great play of Behimer. We respectfully submit that their first view, and District Judge Holly's considered view, of the Behimer defense is right and sound; that it is valueless to impair the validity and quality of Dubbs.

IV

ALLEGED PRIOR ART

With but one exception (Ellis 1,396,999; VII, 3352), all of the prior patents here relied upon were before the courts in the *Root* case. Even the Ellis patent had been pleaded there, but respondent (in privity with Root and there represented by the same counsel as here) apparently concluded in that case that the Ellis patent was without value. The other prior patents relied upon were specifically considered both by the District Court in the case at bar and by the District Court in the *Root* case, and were rejected by both as not seriously challenging the validity of the Dubbs patent.

The Court of Appeals in the case at bar left the District Court's findings undisturbed. In a dissenting opinion, Judge Lindley found the Dubbs patent invalid but did not identify any anticipatory item or state his reasons.

Judge Holly, after a specific discussion of each of the prior art patents here relied upon, said (VI, 3040-1):

> "With great skill and ingenuity counsel for defendant have argued that these patents clearly teach all that is contained in the Dubbs process. But the stubborn fact remains that the great oil com-

panies with their staffs of highly trained technical experts never found it out. The Standard Oil Company of California maintained a research department in which some 200 technicians were employed at a cost of over a million dollars a year. Other great oil companies such as Texas, Gulf and Shell undoubtedly maintained laboratories and technicians to work on the problems presented by the process of obtaining gasoline by cracking heavier petroleum oils. If the prior art taught clean circulation so clearly, how did it happen that nothing better than the Burton and Burton-Clark systems was developed?"

After referring to the way in which the large refiners learned of and recognized the virtues of the Dubbs process, he said (VI, 3043):

> "Thereafter practically all of the great companies took out licenses under the Dubbs patents (the patents in suit and certain other patents) paying millions of dollars in royalties for the privilege.
>
> "This is more than mere commercial success. Here the recognized experts in the art saw the Dubbs process as new and revolutionary. And who was better qualified to judge? *Webster Loom Co.* v. *Higgins*, 105 U. S. 580, 26 L. Ed. 1177; *The Gray Processes Corporation* v. *Danciger Oil & Refineries, Inc.*, 42 U. S. P. Q. 315."

Treating specifically each of the prior art patents here relied upon, the District Court in the case at bar made the following fact finding (VI, 3055):

> "The principle of clean circulation taught in the Dubbs patent is not found in the prior art patents relied upon by the defendant which are British Piel-

sticker patent No. 1308 of 1891, and United States Pielsticker patent No. 477,153, Hall patents Nos. 1,175,910 and 1,242,796, Ellis patent No. 1,398,999, Alexander patent No. 1,407,619, * * * and Greenstreet patent No. 1,740,691. These patents do not teach the Dubbs process to those skilled in the art."

Not one of the prior art patents relied upon was ever commercially used. Two of such patents (Hall and Alexander) relating to a vapor-phase type of operation were tried out by large oil companies under the most favorable auspices, were found wanting and abandoned. Judge Holly, after discussing the inherent defects and infirmities of the Burton and Burton-Clark batch processes, rightly found that they represented the state of the art "as practiced commercially when Dubbs appeared on the scene" (VI, 3037). He thereafter elaborated on the revolutionary character of the clean circulation invention of Dubbs which enabled the commercial manufacture of gasoline by cracking to leap in one giant stride from the static batch method to the clean circulation process with its attendant advantages.

We have also in our main brief (14-5, 21, 30) considered the Trumble patent 1,281,884 (VII, 3285) and endeavored to make it plain why, when the Dubbs demonstration unit was displayed to Pyzel, he at once concluded that the Shell Company, then the assignee of the Trumble patent, had been on the wrong track (I, 510). We may add to what we have said in reference to the Trumble patent the following:

In the Trumble patent (VII, 3287) residual oil is constantly circulated through the cracking coil together with carbon and other deleterious solids. The residual oil con-

tains an insidious highly unsaturated, high boiling liquid material known as polymers or asphaltenes (III, 1374-5). It is a hydrocarbon which will readily and rapidly upon the application of additional cracking heat be converted into carbon and adhere to the walls of the cracking tubes. This insidious material cannot be removed from the Trumble system where but a small part of the liquids and solids are taken from a circulating ring, nor did Trumble appreciate the baneful effect resulting from any return thereof to the cracking coil.* This imposes a limitation on the length of the run and the gasoline yield.**

A characteristic of the Dubbs clean circulation process, is the withdrawal of all residue, both liquids and solids, from the system after each passage of the oil through cracking coil with the return of the clean reflux to the coil for further cracking therein. By withdrawing all the residue, both liquids and solids, from the system, Dubbs prevents the admission to the cracking coil of carbon or other deleterious solids, as well as the liquid polymers or asphalt-

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*The patents to Smith 1,239,423 (VII, 3324) and Edwards 1,170,884 (VII, 3182) discussed in respondent's brief, pp. 48-50, are directed to similar cyclic processes. The circulating residue in each instance is loaded with polymers or asphaltenes that are rapidly converted to coke, accumulating in the cracking zone (III, 1322, 1374-6).

**In respect to the footnote in respondent's brief, page 20, it suffices to say that in *Skelly Oil Company* v. *Universal Oil Products Company* (31 F. (2d) 427), all the evidence of Trumble's early work was before the Court. It was never contended by petitioner in that case that the process of the Trumble patent was used commercially for the production of gasoline prior to the advent of Dubbs. (See respondent's brief (p. 14) in opposition to application for writ of certiorari in this Court in *Skelly Oil Co.*, Petitioner, v. *Universal Oil Products Company*, Respondent, October Term, 1934, No. 419.)

1,179,910.

W. A. HALL.

PROCESS OF MAKING MOTOR FUEL

APPLICATION FILED JAN. 23, 1915.

Patented Mar. 14, 1916.

Witnesses.
A. G. Hammond
Beulah Winnick

William A. Hall
by R. B. Tate
his attorney

"Gases and vapors pass to the stationary"

Air cooled dephlegmators

Preheating Coil - 2

Separator

Vapor phase cracking coils - 4

"Heavy Residue"

"Light Residue"

"Carbon is thrown out in large quantities" in dephlegmators 9 and 14

IN THE UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

enes. This brilliant concept made possible an amazing prolongation of the on-stream cracking operation and a substantial increase in gasoline yields (P. Br. 16-17).

Hall Patent 1,775,910 (VII, 3200)

In rejecting the defense of anticipation insofar as based on this patent and its companion, 1,242,796 (VII, 3230), the District Court in the case at bar said (VI, 3040):

> "The Hall patents describe a vapor phase process, a process negatived by Dubbs, they do not teach a cycling process and the process of these patents when tried out by the Texas Company proved inoperable. It is stated by counsel for defense that the Texas operation was not that of the Hall patents, but if it was not Hall was employed by the Texas Company to construct a plant; the company had knowledge of his patents and his process or processes were never used by the company."

In the *Root* case Judge Nields said (6 F. Supp. 769):

> "The Hall patent describes a vapor phase process. The oil is cracked in vapor form and discharged directly into a condenser without any vaporizing chamber. The reflux does not return directly to the cracking tubes. It returns indirectly in contaminated form."

The history of Hall's trials and failure appears in the record out of the mouths of respondent's witnesses. Briefly summarized, the proofs are to the effect that The Texas Company, one of the largest refiners in this country, in urgent need of a commercial cracking process (II, 975), experimentally tried the Hall *vapor-phase scheme* at Bay-

onne in 1916 and 1917 at an expense of approximately $100,000 and under circumstances offering every possible aid to success (II, 846, 866; III, 1045-6).*

Save for a few unsuccessful experimental runs, water white kerosene was employed as a charging stock because it had been learned from previous work that a heavier stock was unsuitable (III, 1044). The process could not even treat gas-oil (II, 867), the charging material for the Burton method and to respondent's high pressure cracking coil.

All the runs were of the *once-through type*. Even with the selected charging stock, no attempt was ever made to cycle reflux (II, 866-7; III, 1044). This doubtless was due to the circumstance that the distillate produced in the plant was unsuitable as a charging stock for a second run (II 867).

In referring to the Hall operations at Bayonne by The Texas Company, defendant's witness, De Florez, testified (II, 866):

> "Both the Edmonton process and the Bayonne process were essentially once-through; * * *. The whole idea of this was to get this high conversion once through, and it never entered anybody's mind to recycle. It is very simple to look back now on the early days of cracking and say, 'Why didn't you do this or that?' * * *."

Mackenzie testified that an attempt was made to rerun the light residue or reflux from the unit in a *separate and independent* operation of the process but "was unsuccess-

*In respondent's discussion of this process (R. Br., 21), it inaccurately says that the oil "was heated and cracked and largely vaporized". In fact the oil was first vaporized and thereafter cracked, a typical vapor-phase operation.

ful due to the rapid carbon formation in certain of the converter tubes" (V, 2427).

An accountant's tabulation prepared for Holmes, president of The Texas Company, covering the results of the Hall vapor-phase process, contains in Holmes' handwriting a notation of 68¢ as the cost of production of a gallon of gasoline (II, 981). Holmes testified that the operation of the process was discontinued and the apparatus abandoned (II, 975-6).

The Bayonne experiments were carried out under the direction of Hall by a paid employee, De Florez (II, 866). To escape the damaging effect of the testimony of the Bayonne operation, respondent now suggests that this experimental unit did not embody the substance of Hall patent 1,175,910; in the circumstances, as indicated by the District Court, this contention, if true, simply demonstrates that Hall himself did not see in the '910 patent any solution of the problem.

The "light residue" from the dephlegmator 14 of Hall (VII, 3201) is said to contain large quantities of carbon. So contaminated, it would be unsuitable as a recycle stock in a vapor-phase operation. The patent (VII, 3202; pat. p. 2; ll. 113-7) says:

> "Carbon is thrown out in large quantities by the expansion of the gases and collects on the filling material in this and the succeeding dephlegmator."

Dr. Brown said the action here described is characteristic of a vapor-phase process of the Hall type. Cracked residue, tars and carbon existing as a fog or mist will be carried to the dephlegmators 9 and 14 and contained in the heavy and light residues therein (III, 1381). The patent

then says that the carbon-laden light residue from dephlegmator 14 may be used "as raw material for a second run through the cracking coil" (VII, 3203; pat. p. 3; ll. 3-5). This plainly indicates that the light residue is used in *a separate and independent* operation of the process (III, 1382). Attempts were made to so use it in the Bayonne operations of The Texas Company, but these operations demonstrated that this light residue was not suitable as a charging stock even for a separate and independent run. When used on one occasion, coking of the unit resulted (V, 2427).

Alexander Patent 1,407,619 (VII, 3364)

In finding the Dubbs patent valid over Alexander, the District Court in the case at bar said (VI, 3040):

> "Alexander teaches eight different variations of cracking process, none of which had sufficient merit to induce an oil company to actually put them to use. The Gulf Oil Company did experiment with some one of the eight variations suggested by Alexander, though which one the testimony does not clearly show, but the experiment cost the company a million and a half dollars and was a failure. That was the end of the Alexander processes so far as practical use was concerned. The patent in its descriptions and claims is very confusing and I am unable to find that it teaches the Dubbs process."

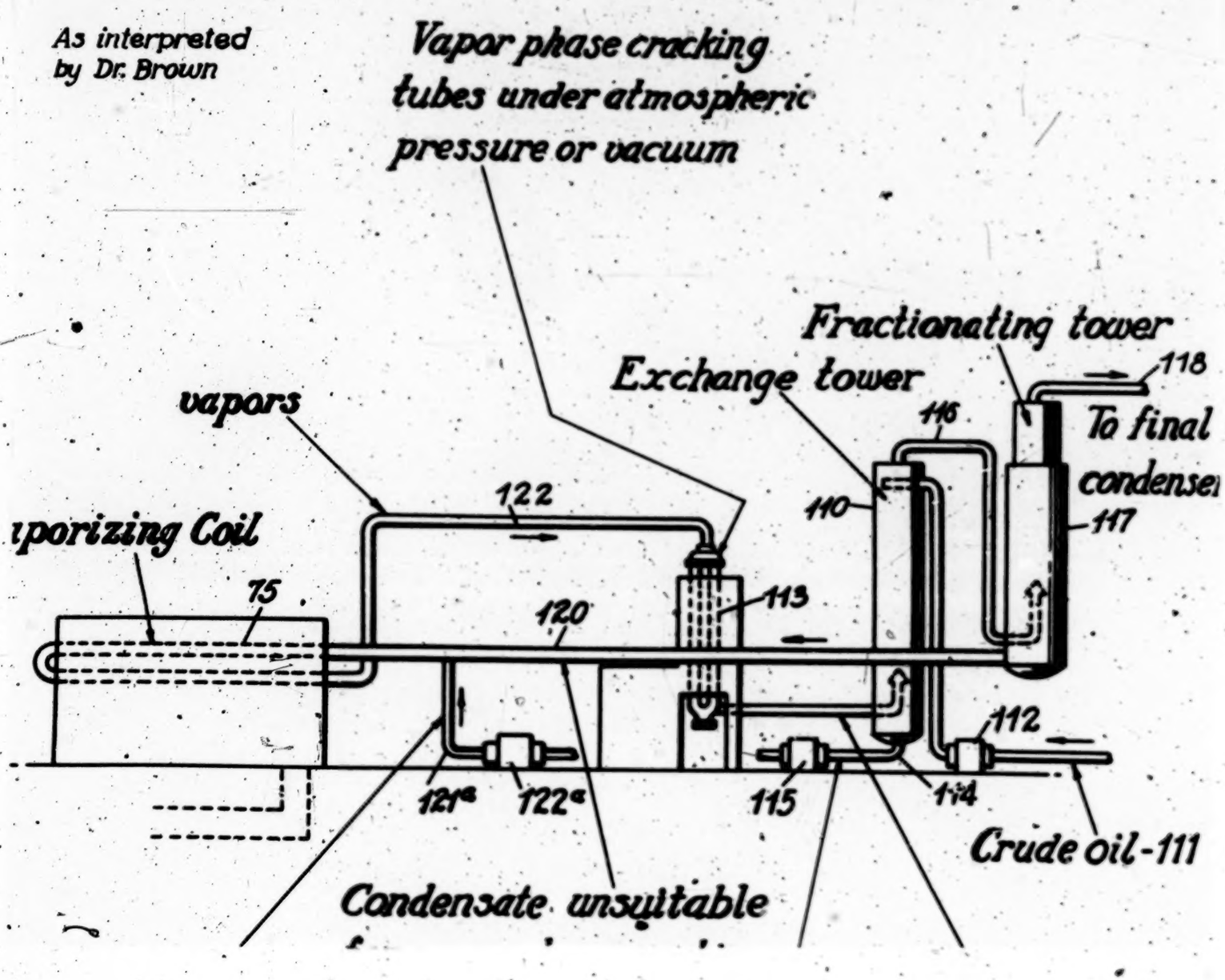
In the *Root* case, Judge Nields found (6 F. Supp. 763, 769):

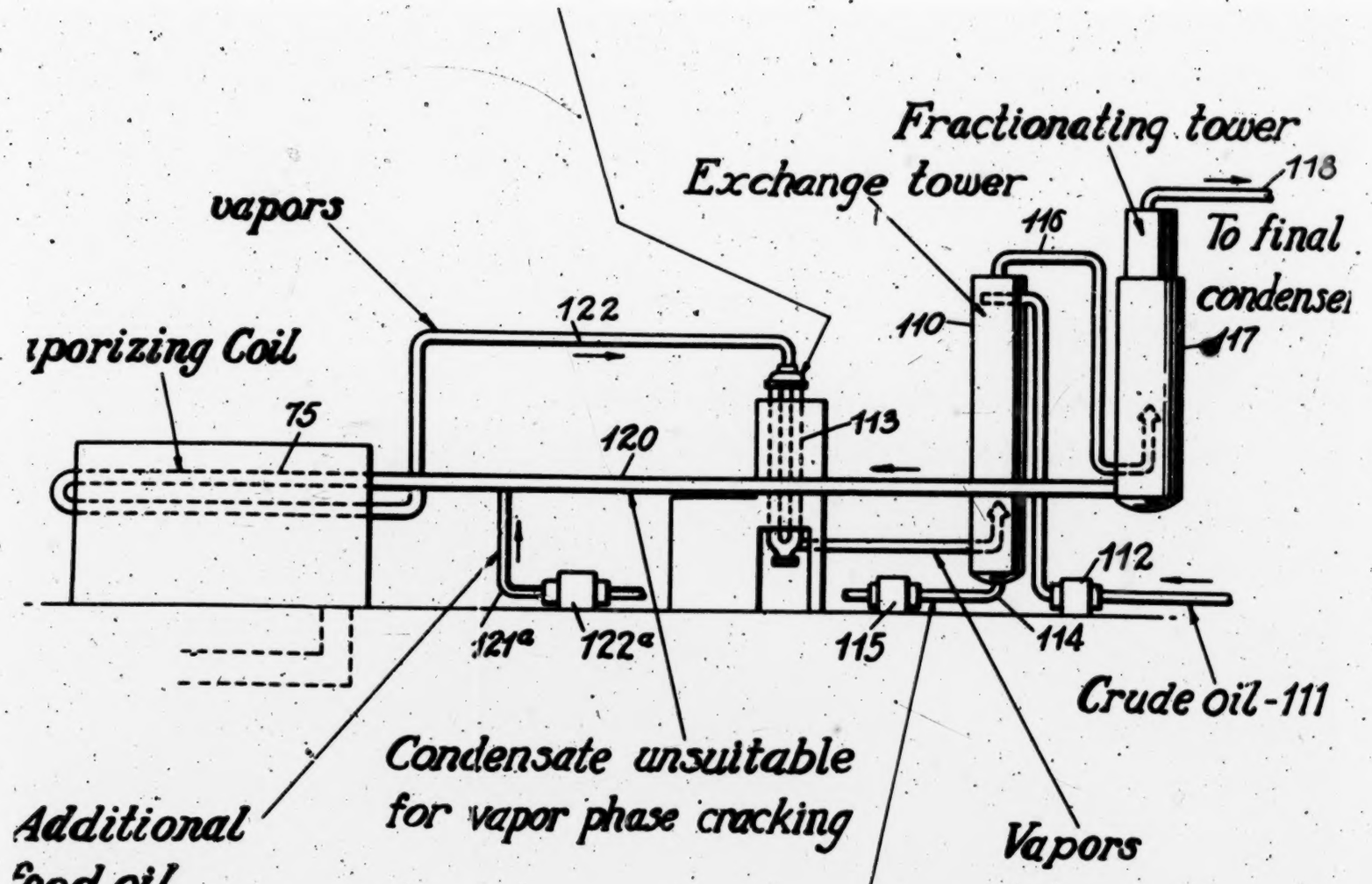
> "The Alexander patent discloses another vapor phase process. It failed although an effort was made to make it work under favorable conditions. Considerable carbon produced in the cracking oper-

Alexander - Patent No. 1,407,619.

Fig. 8 wherein Vaporizer 75 of Fig. 5 is incorporated. page 6 line 95 to 100

As interpreted by Dr. Brown





IN THE UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION
UNIVERSAL OIL PRODUCTS CO.
vs.
NAT. OIL & REFINING CO.
PLAINTIFF'S EXHIBIT 839

ation is carried back with the reflux to the cracking tubes."

The Gulf Refining Company employed Alexander to erect and operate a unit embodying the features of this patent. Construction began in the latter part of 1917, operations occurring as early as 1918 (III, 1349). In this work, in which over one and a half million dollars were spent, Alexander had the unlimited technical and financial resources of the Gulf Company at his command. The project failed and the plant was scrapped (III, 1348). The unit was such an abject failure that Taber, who authorized its installation, testified he "took great pleasure in forgetting it" (III, 1348).

During the first three months of the Gulf operation, the unit conformed to Figure 8 of the Alexander patent, modified by the use of the pipe heater of Figure 5 in lieu of the shell still 121, despite respondent's contentions to the contrary (R. Br. 72). In this operation attempts were made to return condensate from the fractioning tower 117 with and without admixed fresh feed to the vaporizing coil (III, 1353-8). When so operated, carbon deposited rapidly and in large amounts on the walls of the tubes, and the operation was abandoned as a failure (III, 1355, 1357-8).

The unit was thereafter modified to exclude the return of reflux to the heating tubes, with the thought that carbon deposition therein might be avoided. It was converted into a typical once-through vapor-phase operation (III, 1354-7). In the once-through operation, even when using kerosene as a charging stock, serious coke troubles were encountered and the yields of gasoline produced by cracking were so low that the process was discontinued as having no utility and the plant was dismantled (III, 1350-1,

1355). The gasoline yield based on the kerosene charge did not exceed 6-8% (III, 1351), as compared with a 30% yield in the Burton-Clark process with a gas-oil charge. It is not surprising that nothing further was ever done with this fruitless process.

The Gulf Company's decision to abandon this process was not influenced in any way by the color or odor of the end product (III, 1351-2), as inferred in respondent's brief (R. Br. 24-5). Nor was the action of The Texas Company in scrapping the experimental vapor-phase Hall process influenced to the slightest extent by the color or odor of the gasoline. As to the latter operation, respondent's witness Mackenzie testified that the vapor-phase product could be successfully treated to remove any objectionable color and odor (III, 1045-6).

Both the Hall and Alexander vapor-phase processes went the way of the horse and buggy, not because of the color or odor of the products, but because the processes were inoperative in principle and demonstrated to be without value.

Dr. Brown and respondent's expert, Dr. Reiman, agree that the Alexander patent exhibits a typical vapor-phase operation (III, 1256, 1407). It plainly states that the *oil vapors* are cracked under a pressure not exceeding atmospheric, preferably under a vacuum (VII, 3374; pat. p. 2, ll. 47-56, 65-9; p. 3, ll. 17-18).

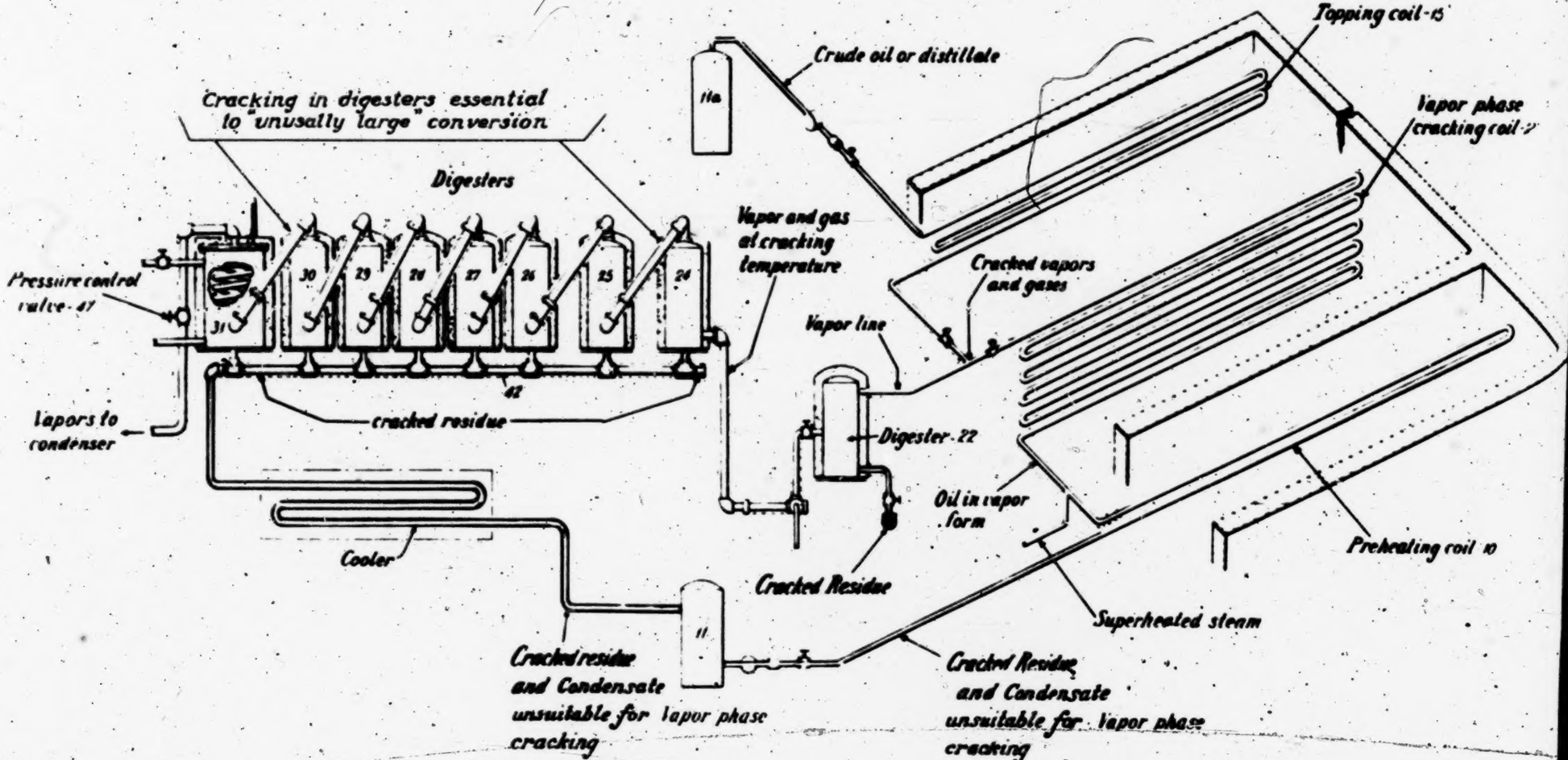
In the Alexander patent the material discharged from the vapor-phase cracking tubes 13 into the chamber 110 is not vaporized* therein, but, to the contrary, the oil enter-

*Vapor generation followed by vapor liberation, or vapor liberation alone.

As interpreted
by Dr. Brown

Greenstreet - Patent No. 1,740,691.

IN THE UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF OKLAHOMA
EASTERN DIVISION
UNIVERSAL OIL PRODUCTS CO. ET AL. No. 1858
vs.
STANOLIND OIL & REFINING CO.
PLAINTIFF'S EXHIBIT 938





ing the chamber 110 is practically all in vapor form, and whatever change in its condition occurs in the tower 110 is solely one of condensation (III, 1405). There is no separation of vapor from the unvaporized residue in the tower 110 (III, 1405-8).

Dr. Brown explained that in the set-up of the Alexander patent, with the vaporizer 75 of Figure 5 incorporated in Figure 8, the scheme was inoperative because the vapors would not be *dry* in the vapor-phase cracking coils 113. Upon the contrary, it would exhibit the "no man's land" condition with the result that, as Gulf's experience proved it to be the fact, the process would be inoperative.

Greenstreet Patent 1,740,691 (VII, 3476)

There is no evidence in this case of any use of the chimerical process of this patent, either experimentally or commercially. It is another item of the prior art directed to the inoperative and discredited vapor-phase type of operation. It does not exhibit clean circulation.

In rejecting the patent as an anticipation for Dubbs, the District Court in this case said (VI, 3040):

> "As to Greenstreet, if I correctly understand the testimony of the experts of the respective parties, the reflux returned for reheating contains the carbonaceous residue and is not clean."

Again, the District Court in the case at the bar made the fact finding (VI, 3056):

> "The Greenstreet patent, according to the testimony of the experts for both plaintiff and defendant, does not disclose the return of a clean reflux, for the reflux returned for reheating contains the carbonaceous residue and is not clean."

In the Root case, Judge Nields said (6 F. Supp. 763, 769):

> "The Greenstreet patent also discloses a vapor phase cracking process. The material subjected to a cracking temperature in one of the cracking coils includes the combined residue of a series of cracking operations to which the vapors are subjected. The cracking digesters load the reflux with carbon and prevent clean circulation."

The experts are in agreement that the patent is directed to a vapor-phase operation (III, 1265-8, 1400). All the demonstrated infirmities of the vapor-phase processes of Hall and Alexander are magnified in Greenstreet. This is because Greenstreet definitely teaches the return to the vapor-phase cracking coil of cracked residue rich in asphaltenes, polymers and other unsaturated high-boiling constituents (III, 1400-3).

In the Greenstreet patent the crude oil or other charging stock is pumped from supply tank 11a to and through the topping coils 15. The stream issuing from the topping coils commingles with the vapor from the vapor-phase cracking coils 2, the mixture flowing to the first digester 22. From the digester 22 the vapors pass successively through the heavily insulated digesters 24-30 where they undergo continued and material cracking with the product of a cracked residue, loaded with asphaltenes and polymers (III, 1401-3), unsuitable as a recycle stock for the cracking process.

Greenstreet places emphasis upon the importance of conserving the cracking heat of the vapors during their passage through the pipe system and the digesters 24 to 30

MAKING GASOLENE SUBSTITUTE.

APPLICATION FILED OCT. 4, 1913.

1,396,999. Patented Nov. 15, 1921.

3 SHEETS—SHEET 2.

Fig. 3.

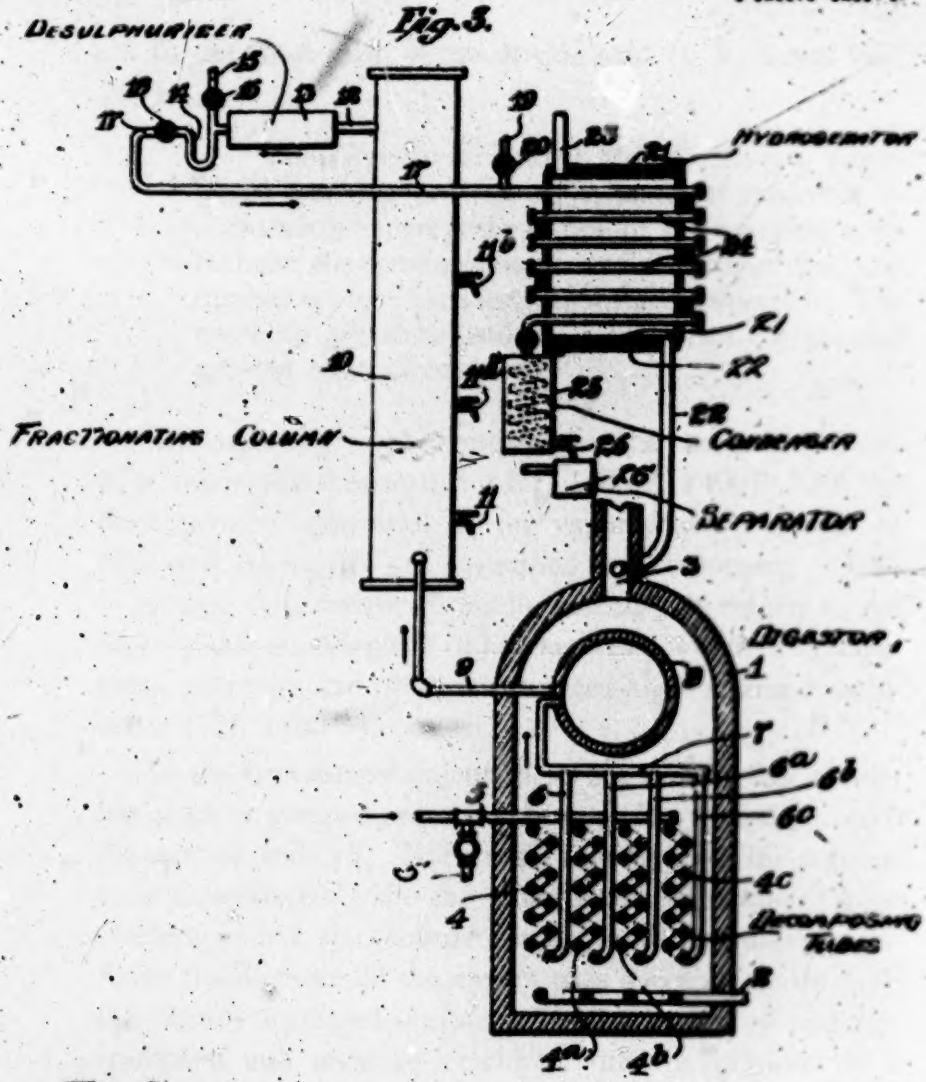


Fig. 5.



Witnesses:

Inventor:

to insure active cracking thereof. Both the pipe system and the digesters are heavily insulated or may be externally heated to conserve the cracking heat (VII, 3482-3; pat. p. 2, ll. 47-50, p. 3, ll. 29-33). This is expressly defined as an essential of the Greenstreet scheme (VII, 3482; pat. p. 2, ll. 108-24). The cracking in the series of digesters necessarily produces carbon and high-boiling unsaturated compounds that are returned to the vapor-phase cracking coils; such a recycle stock is fatal to the process.

Ellis Patent 1,396,999 (VII, 3356)

This patent discloses another typical vapor-phase cracking process. Even though it was pleaded in the *Root* case, it was not there relied upon, presumably because it was concluded to be inadequate.

In holding the Dubbs patent valid over Ellis, the District Court in the case at bar (VI, 3040) said:

> "The Ellis patent, which shows a vapor phase process, does not teach a re-cycling process. The construction of the system as shown by his drawings is such as to prevent the return of reflux condensate to the heating tubes."

These critical findings of the District Court are fully supported by evidence (III, 1377-9). Indeed, respondent's expert, Dr. Reiman, said (III, 1311-2):

> "I concede that this Ellis patent does not specifically say to return the condensate from a partial condenser back to the entrance end of the cracking coil as a continuous operation, and with its contained heat. * * *"

Dr. Brown also testified (III, 1378) that the Ellis patent exhibited a "once-through operation using as a charge kerosene" and that "no means are disclosed for cycling or returning any of the reflux to the treating coils." The drawings of the patent obviously show no means for recycling hot reflux through the cracking coils; nor is any such means described in the specification. Dr. Reiman's concession, in accord with the testimony of Dr. Brown, demonstrates that Ellis does not disclose the essential features of the Dubbs process.

The experts are also in accord, as amply supported by the patent, that the process is confined to a vapor-phase operation and restricted to the use of kerosene as charging stock (III, 1244-6, 1312). Moreover, it is the undisputed testimony of Dr. Brown that Ellis does not suggest a separator interposed between the cracking tubes and the fractionating column from which the residue, after vaporization, is withdrawn, as employed in both the Dubbs and accused processes (III, 1379).

In short, the patent lacks all the characteristics and essential features of the Dubbs process.

Respondent erroneously contends the vapor-phase processes of the prior art function successfully.

Dr. Brown testified that for a successful vapor-phase operation it is necessary that the low-boiling oil be converted into a "dry vapor" before active cracking begins (III, 1364). This is so because if the vapor contains particles of entrained liquid or non-volatilized oil, such entrained particles will adhere to and rapidly coke the cracking tubes (III, 1365). His view is confirmed by

actual observations he had made (III, 1461-4). Largely because they failed to embody this operative requirement, the prior art vapor phase processes were unsuccessful and abandoned.

The facts established by this record fully support Dr. Brown's views and reject respondent's feeble contention to the contrary (R. Br. 70-2). The vapor-phase processes of the Hall and Alexander patents, after fair trial under the most favorable auspices, were abandoned as inoperative or without practical utility prior to 1920. Nothing thereafter came of either of them. The Hall process, limited as it was to the use of a highly volatile water-white kerosene charging stock, produced gasoline at a cost of 68¢ per gallon (II, 976, 981). It was abandoned by The Texas Company when the latter was in urgent need of an operative cracking process.* The colossal failure of the Gulf Company clinches the proposition. It abandoned the Alexander process, after spending over a million and a half dollars on it, *inter alia*, because the gasoline yield based on the charge was but 6 or 7% (III, 1351).

Respondent cannot be benefited by the asserted successful vapor-phase operation of the Skelly Oil Company because that operation, whatever it may have been, first appeared in 1927, long after the advent of Dubbs. This comment applies likewise to the experimental vapor-phase plant which Dr. Reiman asserts that he operated in 1926. Whatever this process may have been, Reiman conceded

*It is an absurdity for respondent to suggest (R. Br. 71) that the Hall process, abandoned by The Texas Company, was successful and possessed practical utility. Nevertheless, it is solely upon this sterile and abandoned operation that respondent relies to support its contention that the vapor-phase process prior to Dubbs was successful.

that it "was abandoned * * * at the end of 1926" and that "as a cracking process it was not operated again" (III, 1298).

Pielsticker Patents, U. S. 477,153 and British 1,308 of 1891 (VII, 3126, 3531).

We agre with respondent that these two ancient patents may be considered together, as their disclosures are substantially the same.

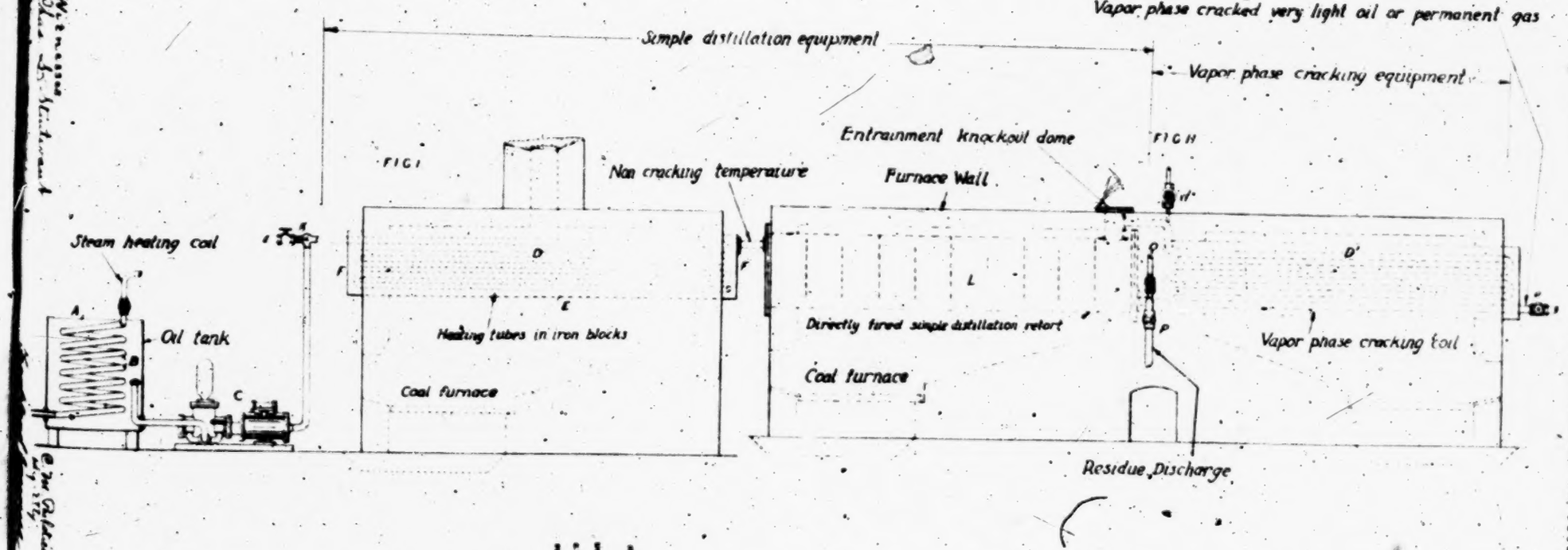
Judge Holly said of these patents (VI, 3039):

> "The Pielsticker patents were issued early in the '90's, the British patent in 1891 and the United States patent in 1892. By a rather strained construction counsel for defendant assert that they teach a withdrawal of residue and return of clear reflux to the heating tubes, but I do not find such teaching. The process as described by Pielsticker appears to be nothing more than simple distillation. A dome appears to be located with the distillation chamber, but it is not a condensing chamber such as is used as a necessary feature of a cracking operation. It is intended apparently to catch the droplets of oil that may be carried with the vapors and prevent their being carried over into the chamber where the vapors are condensed."

In his findings of fact rejecting this defense (VII, 3055), Judge Holly found:

> "The Pielsticker patents do not disclose a teaching of return of clean reflux, unmixed with residue, to the heating tubes, and the process described by Pielsticker appears to be nothing more than simple distillation. Pielsticker's dome is not a condensing chamber such as is used as a necessary

As interpreted
by Dr Brown



(No Model.)

C. M. FIELSTICKER.

DISTILLATION OF HYDROCARBON OR OTHER OILS.

No. 477,153. Patented June 14, 1892.

Witnesses
Chas. F. Wiechmann
E. W. Gilbert

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> feature of a cracking operation but is intended apparently as an entrainment knockout to catch the droplets of oil that may be carried with the vapors and to prevent their being carried over into the chamber where the vapors are condensed."

The above findings of the District Court were not disturbed by the Court of Appeals. They are fully supported by the evidence (III, 1385-1400), which establishes that the Pielsticker patents do not exhibit the clean circulation principle of Dubbs.

In the *Root* case Judge Nields said (6 F. Supp. 763, 769):

> "The Pielsticker patent belongs to the last century. Although it had always been available, no one used it. There is uncertainty as to what it discloses. For obtaining light oils by cracking, Pielsticker discloses a coil without a vaporizing chamber or reflux condenser. He also discloses a heating coil and shell with a plurality of baffles and a dome. Defendant asserts that cracking occurs in the first coil, vapor separation in the shell, the dome is a reflux condenser, and the reflux may be returned to the coil for recracking. This part of the system, however, was intended for distillation. The dome is an entrainment knockout common in distillation. If the shell was intended for a vapor separator it should be heated to a temperature like the coil and have substantial pressure. No one used it because it was useless."

Although these patents issued more than 50 years ago and expired long prior to the advent of commercial gasoline cracking, the record is completely devoid of evidence of any use, experimental or commercial, either here or abroad, of

their disclosures. Such disclosures were available to the refining industry for use at no cost throughout the years when the carbon problem was plaguing oil refiners. Nevertheless, during this period millions of dollars were spent by the refining companies in unsuccessful pursuit of a solution of the problem. All this establishes well nigh conclusively that Pielsticker lacked the teachings necessary for success, which were given to the art by Dubbs. *Paramount Corp.* v. *Tri-Ergon Corp.*, 294 U. S. 464, 474.

The patents are directed to the treatment of hydrocarbon oils and other oils and liquids, such as fats and oils in the separation of fatty acids and glycerine. They further say that the process may be used for the continuous production of distilled water from sea water or the concentration of brine, alkaline solutions and sugar solutions.

Dr. Brown, whose views were accepted by the trial court, directly and succinctly pointed out why Pielsticker fails to exhibit the clean principle of the Dubbs invention. His views may be summarized as follows:

> (1) The operation described by Pielsticker, save for the modification embodying the vapor-phase cracking coil D', concerns primarily simple distillation with but the usual insignificant or incidental cracking (III, 1394-8). Respondent does not contend that the modification, including the once-through vapor-phase cracking coil D', either anticipates or negatives the Dubbs invention.
>
> (2) If permanent gas or a very light oil is to be obtained, Pielsticker suggests, as an addition to the simple distillation heating tubes D and retort I,* the

*Retort L in the U. S. patent.

above-stated vapor-phase cracking coil D'. This is the only *cracking* operation described in the patent (III, 1397). In this operation the gases and vapors issuing from the vapor-phase cracking coil are not subjected to reflux condensation.

(3) A characteristic feature of Pielsticker, illustrated in every embodiment of his invention, is a large externally-fired retort of shell I against which the furnace gases directly contact. Should deep cracking to produce gasoline be carried out in this set-up, including the large shell or retort I, contrary to the teachings of the patent, all of the defects and infirmities of the Burton scheme would be endowed upon Pielsticker (III, 1390). In such an event carbon would rapidly bake upon the walls of the shell or retort I, requiring frequent shutdowns for cleaning and presenting a serious hazard to life and property.

(4) In each assembly drawing of Pielsticker, including the furnace setting, the directly fired shell I is provided with a dome completely embedded within the refractory insulating walls of the setting. This dome functions efficiently as an entrainment knockout device, tending to eliminate particles of liquid from the vapor, desirable in Pielsticker's simple distillation process, but could not function as a partial condenser producing by heat abstraction substantial quantities of reflux condensate (III, 1393-4).

Respondent, in a desperate effort to find some foundation for cracking in Pielsticker's scheme elsewhere than in

the vapor-phase cracking coil D' (R. Br. 63), leans heavily on a vague statement in the British patent that the entrained liquid particles from the insulated dome P, upon return to the retort I, "are reduced in gravity and finally distill over" (VII, 3532; pat. p. 2, ll. 47-8). This language does not connote cracking, as Judge Holly found. In the dome P a coalescence of the particles of entrained liquid carried by the vapor occurs; and it is these coalesced liquid particles containing high and low boiling hydrocarbons that are returned to the retort (III, 1393-4) from the dome P, which functions essentially as an entrainment knockout device. Upon return to the retort, the lighter fractions of these hydrocarbons undergo distillation and pass on to the condenser, leaving the heavier fractions as a part of the residue,—a typical distillation process.

Respondent next contends that cracking is spelled by the statement in the Pielsticker patent that when it is "intended to produce still lighter gravity oils" a valve R may be placed between the retort I and the condenser U (R. Br. 63). The evidence is directly to the contrary. As pointed out by Dr. Brown, and as the District Court held, the lighter gravity oils here described are the products of a simple distillation process carried out under a pressure slightly above atmospheric (III, 1398-9). An increase of the pressure of a few pounds correspondingly retards vaporization in a simple distillation process and offers a suitable means for controlling the quality or boiling point of the final distillate and produce such "still lighter gravity oils" (III, 1396). Such a control is particularly useful with a distillatory system of the Pielsticker type where hand-fired coal furnaces are employed and difficulty is encountered in maintaining a substantially uniform temperature. The pressure varia-

tion stated in the Pielsticker patent to control the quality of the final distillate is today used in the simple distillation process (III, 1398-9).

Respondent, in its brief, attempts to make much of an asserted construction placed upon the United States Pielsticker patent by petitioner in another suit involving a different patent and different parties (R. Br. 64-5). In that suit *no testimony* was presented by either party touching directly or indirectly on the Pielsticker patent. What petitioner may have stated in its briefs in that suit was but the argument of counsel unaided by any testimony. In the case at bar evidence was adduced explaining the Pielsticker patents. It is on the basis of such evidence that the District Court concluded these patents had no anticipatory value.*

Respondent's process does not stem from the prior art but from the Dubbs patent in suit.

In spite of its labored efforts (R. Br. 58-9) respondent cannot liken its concededly mixed phase clean circulation process to the prior art processes. The genealogical charts which it has elaborated (R. Br. 75, 154) in its own behalf lack the authority and authenticity of the family bibles. In its endeavor to find a lineage, respondent has scrambled

*Respondent in its brief (p. 60) leans heavily on an opinion of the Circuit Court of Appeals for the Tenth Circuit in *Texas Co.* v. *Anderson-Pritchard Refining Corp.*, 122 F. (2d) 829, in its effort to give some anticipatory status to Pielsticker and other prior art patents. Petitioner was not a party to that suit and had nothing to do with it. The findings there made can have no persuasive effect here and cannot affect the rule that fact findings of the courts below will not be disturbed if supported by any substantial evidence.

several families of processes, whose only claim to relationship goes back to the Adam of the art involved, namely, the circumstance that these processes suggested or attempted cracking oil.

Respondent's genealogical charts are endowed with the same inaccuracies and errors of interpretation as the testimony of respondent's witnesses, without regard for the disclosure of the original document. We have fully explained, from cause to effect, the deficiencies and limitations of some of the prior art processes and the failure of the others. We have demonstrated that none of the prior art processes could do what respondent's operation accomplishes. Its operation is a mixed phase clean circulation process embodying all the essential features of the process of the Dubbs patent in suit.

V

THE EGLOFF PATENT

(a) *Infringement*

To what we have said in our main brief (P. Br. 44-47, 126-130) including the application of a typical claim (claim 2) of the patent to the accused process (P. Br. 48-50), from which it appears that respondent has slavishly appropriated the Egloff invention and that the claims lay themselves directly on respondent's operation, we desire to add the following:

Although appropriating the principle of Egloff, respondent (R. Br. 147-149) seeks to avert infringement by the erroneous contention that the Egloff patent is confined to liquid phase cracking (without vapor generation) in the

cracking coil 6; this, it asserts, spells mere incipient cracking in said coil as compared with the substantial cracking obtaining in the cracking coil of the accused process. Dr. Brown testified decidedly to the contrary. In referring to the cracking of the reflux condensate occurring in the high temperature high pressure coil 6 of Egloff, Dr. Brown testified that "it seems clear that the teachings in the patent is that the major cracking of the reflux condensate must occur in the coil 6" (II, 779). Considering the cracking of the reflux alone, the proportion of the cracking effected in the cracking coil 6 of Egloff is substantially greater than 20% (R. Br. 148-9). Such substantial cracking would, on respondent's own admission (R. Br. 149) cause substantial vapor generation in coil 6 of Egloff.

Moreover, respondent could not escape infringement even if substantially liquid phase cracking occurred in the coil 6 of Egloff. The claims of the Egloff Patent measure the invention; they are not limited, in language or otherwise, to liquid phase cracking in the cracking coil 6; they are inclusive of both liquid and mixed phase cracking.

We desire also to discuss briefly respondent's argument (R. Br. 148) touching on the significant statement in the Egloff patent (p. 1, ll. 103-7, VII, 3095), which reads:

> "It will thus be seen that the reflux condensate is continuously subjected to recracking, but at different conditions of temperature and pressure or both than that to which the raw oil is subjected."

This illuminating statement, following the description of the objects of the Egloff invention and of the manner in which the process is carried out, plainly teaches substantial

cracking, sufficient to convert the reflux condensate to substantial quantities of gasoline, in the high temperature high pressure coil 6. Without any foundation in the Egloff patent, respondent erroneously assumes that but "further slight cracking" is there contemplated (R. Br. 148).

This assumption does violence to the teachings of the patent. Plainly it is to a large extent upon the "recracking" of reflux under high temperature and pressure in the coil 6 that Egloff relies to obtain substantial conversion of the reflux to gasoline. Coil 6 is the only instrumentality provided by Egloff in which recracking of the reflux can take place under conditions different from those to which the raw oil is subjected (cf. patent, p. 1, ll. 103-7; VII, 3095). The man skilled in the art would understand from these instructions that Egloff contemplated substantial cracking in the coil 6, just as it occurs in the cracking coil or B tubes of the antecedent Dubbs patent upon which Egloff was an improvement.

Notwithstanding respondent's argument to the contrary (R. Br., p. 129), its expert Smith testified he so understood the teachings of the Egloff patent. But he refused to give proper expression to such teachings by confining his consideration of the patent to the specific illustrative temperature and pressure recited in an example thereof.* In his testimony in referring to the sentence in question (III, p. 1111), Smith said:

> "The difficulty with this is that while *he* [Egloff] *says the oil is to be subjected to recracking in this*

*In contrast with Smith's willingness to depart from Dubbs's specific teachings in order to restrict unjustifiedly the process of the Dubbs patent to an operation which would spell non-infringement by respondent's process.

> *coil,* he does not provide enough temperature to accomplish any substantial amount of cracking in the coil; just too low a temperature 770° would not do it."

Thereafter Smith conceded that if the man skilled in the art "knew he wanted to crack in the coil 6 he could run to higher temperatures and accomplish cracking" (III, 1169) and that he did not think there would be any difficulty for the man skilled in the art to design a low temperature coil to do what he wanted to do in that coil (III, 1170). Thus Smith did say, contrary to respondent's contention (R. Br., p. 153), that Egloff taught (1) substantial cracking in the coil 6, and that if the illustrative temperature given in the patent was insufficient to obtain deep cracking therein, (2) it would be within the skill of the calling to use the temperatures required to attain the contemplated end.

Respondent also argues (R. Br. 149-150) that in rejecting claim 3, the Patent Office examiner, in suggesting the word "heated" or the word "cracked" should be inserted before the word "oil", placed Egloff on notice that if he used the word "heated" in his claims, they would be limited to non-cracking in the coils.

In the claims as finally granted to Egloff, including typical claim 2, cracking in the coils was not, as respondent suggests, discarded. In typical claim 2 it is recited that the reflux passes through a heating zone where it is subjected to a *cracking* temperature. In the same claim, the charging stock is recited as undergoing heating to a *cracking* temperature. Obviously cracking in the coils was never disclaimed.

This was fully understood by the examiner. In the Patent Office letter to which respondent calls attention (IV, 1631), the examiner said "Applicant also mixes his *cracked reflux* with his cracked oil in the expansion chamber 12." Thus the Patent Office understood that Egloff's reflux was *cracked*, before it reached the expansion chamber, obviously in coil 6. In the remarks presenting the claims appearing in the patent (IV, 1641), it is expressly stated that the condensate is to be heated to a temperature "necessary for properly cracking" the same.

A complete answer to respondent's fallacious argument (R. Br. 151-2) that Egloff does not teach the production of a clean charging stock *in situ*, such as practiced in the accused process, is found in our main brief (P. Br. 44-6, 127-8). Nothing need be added to what is there said.

(b) *Alleged Prior Art*

Respondent's contention that if Egloff is infringed, it is anticipated by the vapor phase patents to Alexander (VII, 3364) and Greenstreet (VII, 3476) is unsound. The Egloff patent and each of the claims thereof are characterized by the low temperature mild cracking coil 5, the high temperature high pressure cracking coil 6 and the common expansion chamber 12. An essential of the patent is the production of a clean reflux or distillate oil from vapors generated from the oil passed through the two coils and entering the expansion chamber 12, constituting a clean distillate charging stock, uncontaminated with residue, for return to the inlet of the high temperature coil.

In the consideration of the prior art applicable to Dubbs, we have demonstrated that the Alexander process tried out by the Gulf Company at a cost of 1,500,000 dollars and

abandoned as a failure, lacks the essentials of Egloff. To what is there said it may be added that Alexander does not exhibit in a combination unit the low temperature mild cracking coil 5 of Egloff, or its equivalent, by which the crude oil is mildly cracked and the cracking heat utilized to aid in the production of a clean distillate stock for the high temperature cracking coil 6 of the Egloff patent.

Under the same heading in this brief, we have also demonstrated that the Greenstreet paper patent is of no anticipatory value. As a result of the drastic and extensive vapor phase cracking occurring in the digesters 24 to 31 (VII, 3480) the residue admitted to Greenstreet's vapor phase cracking coil 2 is loaded with polymers and carbon. It is not a clean distillate stock. Both of the items of the prior art cited against the Egloff patent relate to the non-anticipatory and discredited vapor phase process.

CONCLUSION

Both of the patents in suit should be held valid and infringed, and the judgment of the court below should be reversed.

Respectfully submitted,

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